amateur radio

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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FEATURED IN THIS ISSUE:

- ★ OPTICAL COMMUNICATION FOR THE AMATEUR
- ★ OSCAR 8 READY RECKONER
- ★ JOHN MOYLE FIELD DAY RULES
- ★ TASMANIAN AMATEUR RADIO CONVENTION
- ★ MR. DAVID JULL, M.P., REPORTS ON CHANNELS 0 AND 5A

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amateur radio

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Cover Photo

Auction time at the Tasmanian Amateur Radio Convention held in Hobart over the week-end November 4-5, 1978. Associate member Alan Ruthven (holding microphone) tries to push the bids higher as Andrew VK7ZAJ (left) and Brian VK7ZBL display the goods (an old AWA modulation monitor).

Photo courtesy Tom Moffat VK7TM.

QSP "THIS IS 1979"

On behalf of the Federal President, Officers and the Administration of the WIA I wish you all a Happy New Year and best wishes for 1979. It is traditional at this time of the year, to make New Year resolutions and look forward into the future.

This year, to some extent, we know what the future holds as we look forward — with some concern — to the World Administrative Radio Conference — WARC 79 — in October. The outcome of the WARC is still anybody's guess. The IARU Region III Conference held in October in Bangkok made this quite clear because at that time the position of many of the smaller countries with respect to the WARC was still unknown, if not unformed!

The preliminary position of the Australian Administration is reasonably well known, however, and whilst it is not entirely "sugar coated" as far the the Amateur Service is concerned, it is at least constructive and not anti-amateur radio.

The Institute, as reported in the past, has been instrumental in preparing the Australian Amateurs' case — a job which will not be finished until the actual WARC Conference is over. Right up until then, representatives of the various amateur bodies, including the WIA, will be providing advice to their administrations on matters pertaining to the Amateur Service which arise during the varied sessions at Geneva.

During this period, the financial strain on the Institute will be enormous — Geneva is NOT the cheapest place to stay for 10 weeks, especially during peak demand period such as an ITU Conference. Happily, the tremendous growth in membership of recent years — 118 increase in 1976 to 1372 increase in 1978 up to October — has enabled the Executive to financially plan ahead, although the continuing devaluation of the Australian dollar against the Swiss Franc must give rise to concern.

Membership growth has also enabled us to keep fees at an attractive level which in turn has generated more members. Further, during the year the Federal President in a personal letter to all non-members solicited contributions for the WARC commitment.

You, as a member, can further help during our time of testing later in the year by encouraging membership of this Institute. In fact why not make a New Year resolution to join a new member during the year.

A Happy New Year to you all (let's hope the same greeting can be offered at this time next year).

P. WOLFENDEN VK3ZPA
Executive Vice Chairman ■

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VK4 — QSL Officer, G.P.O. Box 638, Brisbane, Qld., 4001.
VK5 — QSL Bureau, Mr. Geo. Luxon VK5RX, 203 Belair Road, Torrens Park, S.A. 5062.
VK6 — QSL Bureau, Mr. J. Rumble VK6RU, G.P.O. Box F319, Perth, W.A. 6001.
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VK8 — QSL Bureau, C/- VK8HA, P.O. Box 1418, Darwin, N.T. 5794.
VK9, 0 — Federal QSL Bureau, 23 Landale Street, Box Hill, Vic. 3128.

WIANEWS

AMATEUR HANDBOOK

"Out of the blue" came a telephone call on a Monday morning asking if the Institute could collect the draft of the Handbook at the end of the week.

Not only was the Department's draft completed but the presence of a WIA representative was desirable to receive comments on the contents as written.

The Federal President and the WIA Secretary duly met the Departmental officer and received a copy. Various provisions in the draft were explained at some length during the handing over.

It soon became obvious that the new draft had taken into account all the numerous little concessions won by the Institute since the previous edition had been printed eleven years previously, but it now contained a number of new provisions which would require considerable investigation by the Institute.

The Federal President himself was absent from Australia, attending the CCIR meeting as a member of the Australian delegation. The Department had received many comments from the Executive when a revision was set in motion back in 1974. Some further work had been done, as well as discussions held on various specific questions with the Department. As one example, see the correspondence published on pages 20 and 21 of AR for September 1977.

At the Joint Committee Meeting late in August the WIA was told that the Department would have to produce a revision of the Handbook based on existing Regulations as both the proposed new Act and the outcome of WARC 79 were too far ahead. However, due to staff problems, the Handbook revision was unlikely to be done for some time.

As an outcome of this Joint Meeting the Executive persuaded VK1GB to undertake a further revision as already explained in WIANEWS, page 4, November AR. The Department's draft was completed very much sooner than anticipated and furthermore the Institute was asked to assemble comments in time for the Joint Committee Meeting scheduled for 22nd November (Letter RG53/2/1).

The Department were asked to grant an extension of three months so that the contents and implications of the draft could be given proper consideration for the reasons already explained.

Amateurs should be aware that the purpose of the Handbook is to set out in simple terms the regulations made under the Wireless Telegraphy Act. In most cases the provisions of the Handbook amount to an explanation of the effect of one or other of the regulations.

REGULATIONS UNDER THE WIRELESS TELEGRAPHY ACT PREVAIL OVER PROVISIONS IN THE HANDBOOK

Under the Regulations, the Minister has the power to impose conditions on a licence. Penalties exist for contraventions of the Regulations and of any licence conditions.

Quite naturally, many amateurs will be interested in how the new draft of the Handbook departs from the contents of the old. It is not feasible to reproduce the new draft in full, but amateurs may rest assured that the Executive, with legal and technical advice from many expert quarters, has the matter well in hand in accordance with Federal Council policies.

Naturally, the new draft includes various provisions relating to Novice examinations, licences, conditions and similar matters already public knowledge through Departmental correspondence published in AR.

A number of new definitions have been introduced in Chapter 1. Some are well established — as "Amateur Satellite Service". Others are obvious in the contexts used — as examples "Slow Scan Television", "Repeater Station", "The Minister", "Session", and so on. One or two new definitions appear such as "Duplex Operation" in addition to several adapted from ITU Regulations, including "Harmful interference", "necessary bandwidth", "occupied bandwidth" and "spurious emission". The omission of a definition of a "portable station" has relevance elsewhere.

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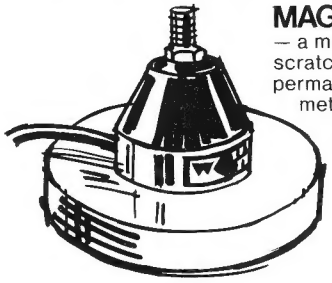

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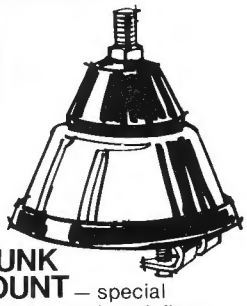

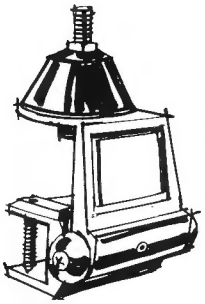

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Chapter 2 deals with qualifications for licences and now includes the reciprocal licensing provisions agreed by the Department in 1972 (see AR Aug. 1972, page 17) with some re-wording.

Chapter 3 covers examinations, which includes new material relating to morse, and also refers the reader to appendices which have been considerably expanded.

Licences are dealt with in Chapter 4 and include new provisions relating to Club licences, pre-licensing conditions for repeaters and natural changes resulting from the change-over from "PMG's Dept." to "P. & T. Dept".

Mechanical provisions appear in Chapter 5. It is in this chapter that the new definitions on bandwidths and spurii have relevance. Repeater conditions are set out in full and some discussions, still open-ended, were held as to whether or not these (and indeed certain other material) would be included in examinations. An amateur will be required not only to use suitable monitoring equipment frequently but also must possess suitable calibration facilities to ensure in-band emissions. RTTY, facsimile, ATV and SSTV conditions appear in this chapter. Interference provisions are the same as in paras 68 and 69 of the existing Handbook. A new provision relating to poor quality signals appears as well as a number of variations relating to power (changed to 100W mean power output) and power measurement (accurate power measuring instruments for continuous use are required). A preference, for inspection purposes, is expressed for RF output connectors on transmitters.

Chapter 6 includes the General provisions. New additions include provisions relating to broadcasts from club (includes WIA) stations, "third party" does not include arranging skeds on behalf of another amateur station, nets for information exchange on behalf of social, religious and other specified organisations are forbidden, only an Australian amateur may operate from a station during the absence of a licensee, visitors to stations may not announce station call signs or operate equipment, more stringent logging conditions for club station operations and the retention of all log books 12 months after the last entry. Mobile operations can now extend to 4 weeks without prior approval (exception being club stations), provisions for second licences and callsigns, new maritime mobile provisions, emergency network provisions and training exercises are included with some new material, callsign suffixes are updated, re-issues of deceased's callsigns (5 years) and cancellations (2 years) and distress calls appear herein also.

Operating procedures are in Chapter 7 and include various fresh requirements relating particularly to duplex operations. Chapter 8 includes various miscellaneous items such as phonetic alphabet, morse code, Q code, abbreviations and advisory committees.

HANDBOOK CONTENTS LISTED ARE ONLY IN DRAFT FORM

Readers should be careful to remember that these comments refer to an examination of the Department's new draft and are merely brief notations of many of the observed changes as seen in November 1978 when this script was prepared.

Members who might wish to make comments should consult with their Divisional Council.

EXAMINATIONS

At the time of writing an AOCP theory exam syllabus had not been received from the Department.

MEETINGS

EXECUTIVE MEETING, 17th OCTOBER

Reprints of membership certificates and subscription notices were discussed. Position of Honorary Treasurer still unfilled. Brief reports discussed on WARC 79 and IARU matters. The Institute had promised (as already included in the budget) $1000 for IARU Region 3 association reprensentation at WARC 79. Fresh office accommodation might be required in the near future if the existing tenancy is cancelled. Form RB 381 (Q) implications discussed. New publicity leaflet "8000" to be reprinted when Divisional subs rates for 1979 are known. Possibility of new Departmental draft of the Handbook.

PROJECT ASERT MEETING, 11th OCTOBER

Organisational matters.

FEDERAL REPEATER SUB-COMMITTEE

One meeting relating to repeater conditions and need for further data on 2m channel numbering systems, linking of repeaters and band plans.

PUBLICATIONS COMMITTEE MEETING, 2nd NOVEMBER

Usual volume of routine matters, revision and reprinting of WIA log book, consideration of a questionnaire, 1979 call book and availability of 1000 copies of December AR (Novice issue) for outside sale (one for one with December 1977 at no extra charge).

WARC 79 DONATIONS

— from non-members are pouring in resulting from the circular. Many donors also wish to join the WIA. It is disappointing to observe that some 200 letters to non-members have been returned to sender (address unknown, left address, etc.). This means that the 1979 call book for these people will be inaccurate unless some other method can be discovered to obtain further information on each one. ■

Central Coast Amateur Radio Club

22nd Annual Field Day

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Toorak, Vic. 3142
for details of how to join.

QSP

EXPERIMENTATION AND WARC 79

"Perhaps the real challenge for the amateur is at SHF and the upper end of UHF, in the development of simple and easily reproduced stable equipment for narrow-band applications such as CW and SSB; the spin-off would not be in communications so much as in designs for **inherent** stability in areas where synthesiser techniques are for one reason or another impracticable. This will enable interesting and important work to be done by amateurs — again, as at HF, in propagation.

It seems very likely that we have as yet only scratched the surface of knowledge of propagation, even at HF, and the amount to be learnt on the higher frequencies is enormous. And, as before, it is only the presence of a geographically randomly occurring service which makes the study **possible,** let alone practical. Therein lies our hope for the future, comprising as it does a mixture of "appliance operating" on the one hand, and technical experimentation on the other — and that is what amateur radio is about, **exactly!**"

Extract from Editorial in Short Wave Magazine, September 1978.

CB

"While I have no wish to be burnt at the stake for heresy, I will venture the opinion that the 27 MHz band has generated far more radio amateurs in the short period since we lost it than it ever did while it was an amateur band." Extract from an article in the SA Journal October 1978. ■

OPTICAL COMMUNICATION FOR THE AMATEUR

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HISTORICAL BACKGROUND

The use of audio-modulated light beams for communication pre-dates the first radiotelephone experiments by nearly 25 years. In 1881, Chicester A. Bell and Charles Sumner-Tainter used vibrating mirror systems to superimpose sound modulation on reflected beams of sunlight. Using receivers employing selenium photoconductive cells, ranges of about 700 feet were spanned by this "photophone" system (see Figs. 1-4).

With similar equipment, Rankine demonstrated a system with a range of several miles in 1916.

The German and Australian armies did some of the first communication experiments with modulated electric light sources around 1935, using techniques derived from the recording of optical sound tracks on talkie film. The high directivity and security of these systems gave them obvious military applications at a time when microwave hardware was not available.

A resurgence in optical communication came with the rapid advances in opto-electronics after 1960. In 1962, television signals were transmitted 18 miles using a modulated infra-red beam generated by a GaAs diode, prior to the general availability of the laser. The all-time distance record for terrestrial optical communication was set in May 1963, when a voice-modulated 6328 Angstrom helium-neon laser beam was transmitted 118 miles, from Panamint Ridge, near Death Valley, California, to a point in the San Gabriel Mouontains near Pasadena. An amplitude modulated amateur radio transmitter was used for energising the laser.

Since that time, research has centred around pulse modulation of lasers (1963), coding techniques, heterodyne detection schemes using local laser oscillators (1965), optical FM (1968), and optical fibre light guide technology.

Optical communication is becoming succuessful as an engineering alternative to microwave technology because of the development of the laser, the existence of an established optical technology, and the lack of success with millimeter wave hardware.

Atmospheric optical communication is likely to remain limited to non-commercial applications. These include amateur radio, citizens band type point-to-point communication, and perhaps local area community broadcasting, as proposed by the British "Radio Love" group, and demonstrated by them around 1971 (see Fig. 5).

Its commercial applications will almost certainly be in conjunction with light guide optical fibre cable systems.

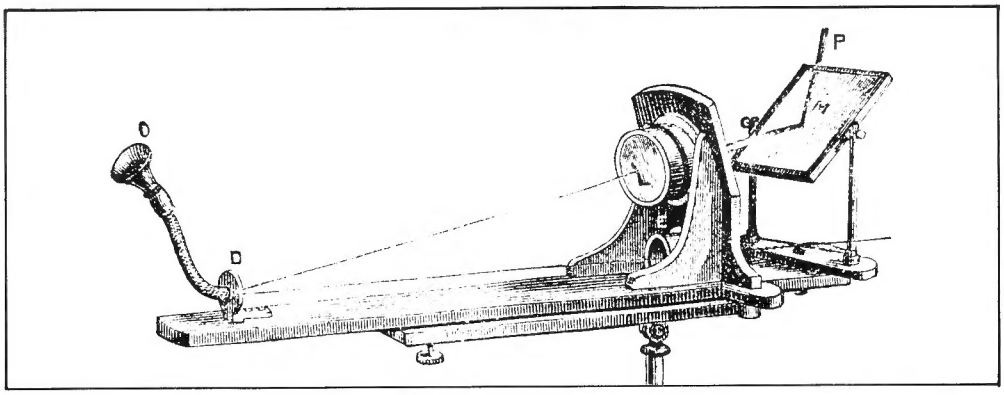


FIG. 1: Photophonic Transmitter

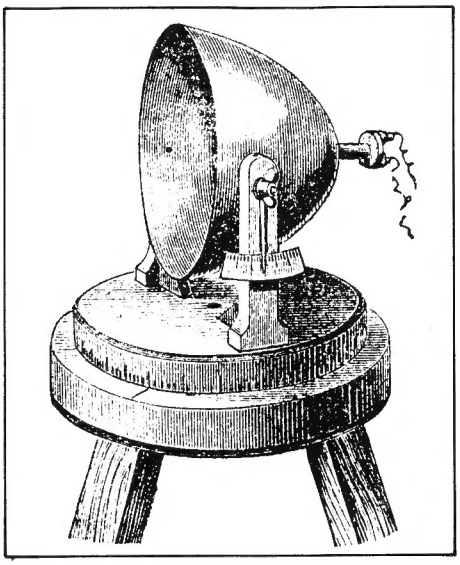


FIG. 2: Paraboloidal Receiver

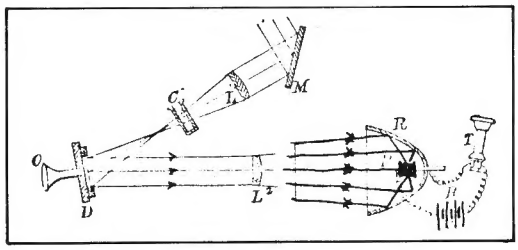


FIG. 3: Photophonic Transmission of Speech

PECULIARITIES OF OPTICAL COMMUNICATIONS

The major difference between radio and optical communication is the emergence, at optical frequencies, of quantum effects. For a given transmitter power, the number of photons generated will decrease as the frequency increases. This is predicted by the Einstein-Planck relation:

$$E = hf$$

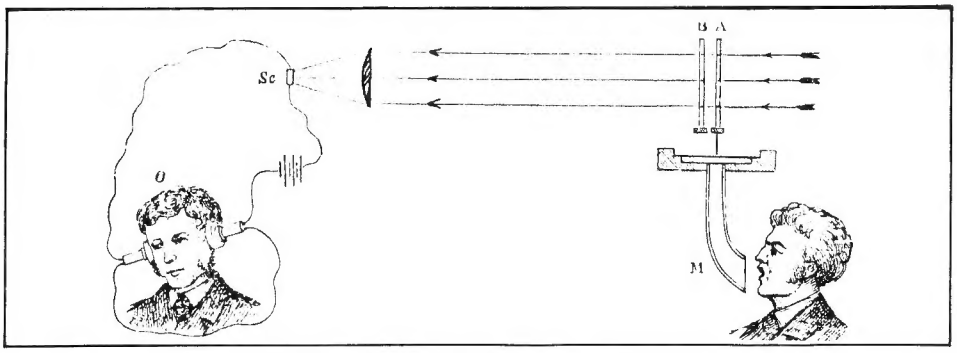


FIG. 4: Sending speech by means of light

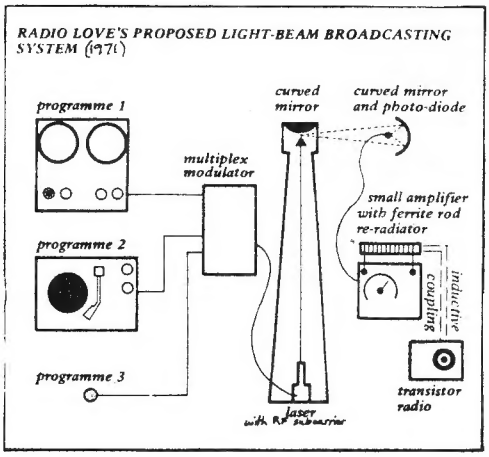


FIGURE 5

Where E is the energy of one photon
f is the frequency of the photon
h is a proportionally constant, called Planck's constant.

So many photons are generated for each watt of input power at radio frequencies that radio waves follow a predictable wave model in their propagation. At optical frequencies, the photon effects can no longer be ignored. We have to stop thinking of our "carrier" as being a wave, and start thinking of it as a stream of particles, whose arrival time at the detector is governed by probability theory.

In a way, we can think of our **carrier** signal in terms of two different frequency parameters:

1. The frequency of the light
2. The frequency of arrival of the photons.

To recover a useful signal, a communication system must receive at least 2B photons per second, where B is the information bandwidth. This is for the ideal case where the detector will demodulate every photon, i.e. the detector will have 100 per cent quantum efficiency. In practice, the number of photons per second required to extract a useable signal will be much higher, owing to noise sources and limiting background radiation. At optical frequencies, information bandwidth is usually more limited by the received signal power than by the frequency of the carrier. Fortunately, the narrow beamwidths attainable in optical systems allow high signal intensities to be received at long distances.

Because of the corpuscular nature of the received beam the signal itself, with its statistical fluctuations of power, is a source of noise in the system.

ATMOSPHERIC PROPAGATION IN OPTICAL COMMUNICATIONS

This section deals with the following areas:

1. Effect of atmosphere on optical signals
2. Over-the-horizon optical links using cloud scatter
3. Background ambience limitations
4. Effect of transmitter and receiver optics.

1. EFFECT OF ATMOSPHERE ON OPTICAL SIGNALS

Unlike radio propagation, where the atmosphere is generally transparent, the atmosphere can seriously degrade optical signals through scattering, absorption, refraction and dispersion.

Scattering problems, due to particles suspended in the atmosphere, can be divided into three areas:

(i) **Rayleigh scattering,** due to molecular particles much smaller than the wavelength of propagation. This is inversely proportional to the fourth power of the wavelength. Blue light therefore encounters about 10 times the amount of scattering that red light encounters.

(ii) **Mie scattering,** due to particles comparable to or larger than the wavelength of propagation, such as those encountered in fog, smog and haze. Mie scattering is very difficult to calculate mathematically, but is severest when the particle size is approximately equal to the wavelength of propagation.

Hazy conditions are due to small dry particles in the atmosphere, and here the use of relatively long (IR) wavelengths can result in greatly reduced attenuation.

Stable fogs, consisting of water that has condensed on salt nuclei are often encountered in coastal and maritime regions. Stable fog particles are large, and result in severe beam attenuation.

Selective fogs (smog) in which water condenses around smoke particles are found in industrial areas, and the particles are quite small, allowing transmission at IR wavelengths.

(iii) **Scattering of radiation from unwanted sources** into the beam path, producing limiting background light levels. The mechanisms responsible have been outlined above.

For almost all wavelengths less than 1.25 microns, including the visible spectrum, scattering is the major contributor to path loss and background light level limitations.

Absorption is caused by the atmosphere's molecular constituents. Peaks in the atmospheric absorption vs. wavelength curve correspond to the spectral absorption lines of the atmosphere's component gases, and may be as narrow as 1 Angstrom. This illustrates the care which must be exercised in selecting the wavelength of an optical communication system suited to atmospheric propagation. Absorption characteristics may vary by as much as 20:1 for different wavelengths.

Fortunately, the visible spectrum is almost free of molecular absorption bands, as the atmosphere's major constituents, N_2 and O_2 absorb mainly ultraviolet radiation. Absorptions in the visible spectrum include slight ozone (O_3) absorption between 5000 and 7000 Angstroms, and oxygen absorption bands at 6880 and 7600 Angstroms. The most important obsorbing compounds at visual frequencies and low altitudes are H_2O and CO_2. Owing to the high absorptions of O_2, CO_2 and H_2O at IF frequencies, the atmosphere is transmissive only in a series of narrow "windows", lying between the absorptive frequencies of these compounds.

Atmospheric refraction fluctuations may bend the light beam. When the atmospheric density discontinuities are large compared with the diameter of the beam, this may cause it to miss the receiver entirely. This is a point in favour of using a broad, dispersive transmitted beam. More usually, this bending only causes fluctuations in the received intensity of the beam, or *twinkling.*

When the density discontinuities or *turbs* are small compared to the beam diameter, alternate dispersion and focussing of the beam may result, having a similar effect. These atmospheric density fluctuations can cause interference to the transmitted beam at up to a 500 Hz rate; are worst in hot, windy condtions at low altitude; and constitute the main reason for favouring the pulsed-FM technique over simpler analogue intensity modulation for optical communicatio nthrough the atmosphere. By using pulsed FM technique, amplitude variations due to atmospheric degradation may be clipped off at the receiver.

In laser systems, these atmospheric turbulences can cause a partial loss of beam coherence, with phase cancellation effects resulting in a source of noise, rendering heterodyne reception by a local laser oscillator impractical over all but short distances. The use of light guides and optical fibres seems to be the only way of overcoming these difficulties.

Despite the apparent limitations, reliability of optical links is surprisingly good,

particularly up to ranges of 15 km. In one experimental system, a 3.5 km link gave 3 months of constant service on an alternate night usage, the signal to noise ratio never falling below 10 dB, even during heavy rain. Usually, the signal to noise ratio of this AM link, based on high pressure mercury vapour discharge lamps and the 931A photomultiplier exceeded 40 dB.

2. OVER THE HORIZON OPTICAL LINKS USING CLOUD SCATTER

At any time about 50 per cent of the earth's surface is under cloud cover. The angular distribution of light scattered from clouds is a function of water droplet size and the wavelength of propagation.

Assuming that the beam width angles are very much smaller than the angle between the beams and the line joining the two sites, and considering the simple case where the transmitted and received beams are tangent to the earth with the cloud at the beam intersection, then the minimum height of the cloud for small θ will be:

$$\text{Hmin.} = \text{Radius of the earth} \times \frac{\theta^2}{2}$$

(See Figure 6.)

If below Hmin., the cloud will be below the horizon at both transmitter and receiver. If above, there will be a decreased scattered intensity.

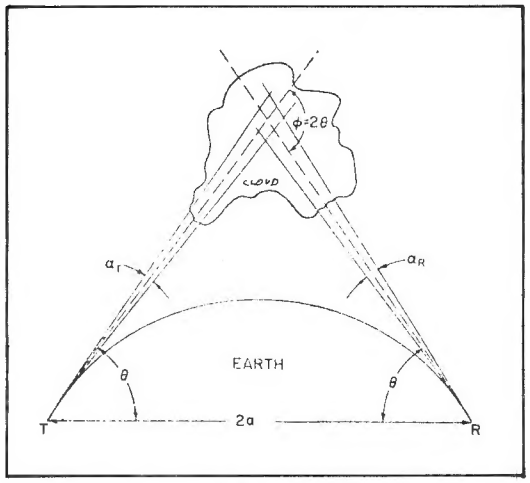


FIG. 6: An example of over-the-horizon communications link

3. BACKGROUND AMBIENCE LIMITATIONS

By far the greatest source of unwanted background ambient light in optical communications is the sun, whose radiation approximates that of a 6000°K. blackbody. This energy is received both by reflection from the background surrounding the transmitting end of the link, and by scattering in the intervening atmosphere. Three methods may be used whereby this background ambience can be avoided:

(i) Reduction in receiver beamwidth (field of view).

(ii) Reduction in optical bandwidth of the receiver by means of narrow spectral filters passing only the wavelength of propagation. Heterodyne reception can also be used to reduce received bandwidth.

(iii) The use of longer wavelengths and polarising filters to avoid the pickup of light due to Rayleigh scattering in the atmosphere.

Methods for reducing receiver beamwidth will be dealt with in the section on receiver optics. A compromise must be struck between the need for narrow beamwidth and the ease of lining up. Receiver mounting stability can be a major constructional problem with the very narrow beamwidths achievable in optical systems.

To further increase signal-to-noise ratio, we must use narrow spectral filters. For non-coherent sources, a wide spectral filter must be used to pass an appreciable amount of the transmitted light. Light emitting diodes, for instance, have a typical spectral width of 300 Angstroms. With a gas discharge light source, such as a high pressure mercury vapour lamp, a filter may be selected to accept one of the more dominant spectral lines. In the case of the mercury lamp, any one of the following wavelengths could be selected, according to the spectral response of the photodetector used:

4047 Angstroms Violet
4358 Angstroms Blue
5461 Angstroms Green
5780 Angstroms Yellow

Xenon arc lamps, having a relatively continuous emission spectrum, may not be selectively filtered in this way, and this is a major consideration against their usefulness for optical communications.

The best type of filter presently available for this is the optical interference filter. The simplest transmissive interference filters consist of a transparent film of calibrated thickness coated on each side with a semi-reflecting metallic film. Maximum transmission occurs at the wavelength for which the optical thickness is an integer multiple of half-wavelengths.

Single or multiplier filters of this type are obtainable, covering any wavelength required between 2000 Angstroms and 200,000 Angstroms. Transmissions of 90 per cent are attainable, with spectral bandwidths as narrow as 10 Angstroms in the visible region. They can be made to order by:

Spectrolab,
12484 Gladstone,
Sylmor,
California (USA).

The use of long (IR) wavelengths to some extent alleviates scattering problems as the wavelength becomes larger than the scattering particles.

The scattered light of the sky is partially polarised, so that polaroid filters may be experimentally positioned at the receiver to remove this component of the scattered light.

4. SYSTEM OPTICS FOR ATMOSPHERIC PROPAGATION

The lenses and mirrors used for transmission and reception in optical communications are analogous to the antennae used in radio communication.

Ideally, the transmitted light beam should fall completely within the aperture of the receiver. This can't be achieved economically except over short ranges, but the effects of the inverse square law can be offset quite effectively by optical means. The accompanying graph (Fig. 7) shows the loss between two optical systems of equal diameter and aperture "a". The loss is seen to be kept low out to a distance "R" between the systems, of the order of a/θ, where θ is the divergence angle of the transmitted beam. For $\theta = 10^{-4}$ radian and a = 1 metre, R approx. = 10 km. Since the beam focussing achieveable depends, owing to diffraction effects, on the wavelength of radiation and the aperture of the transmitting system, as θ approx. = wavelength/a, another way of expressing the distance for low loss is:

$$R = \frac{a^2}{\text{wavelength}}$$

Special requirements of the optics used for communications systems are as follows:

A. RECEIVER

(i) Must have maximum aperture to capture greatest number of photons from transmitter.

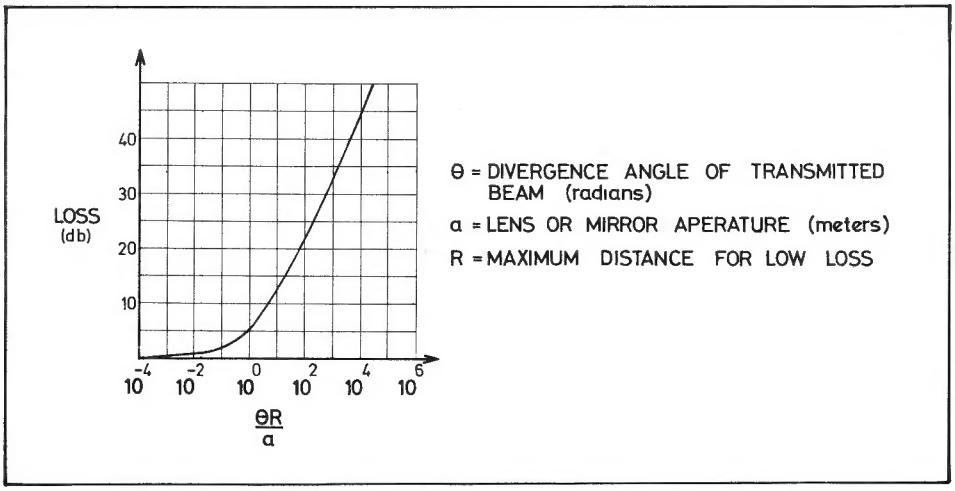


FIG. 7: Transmission loss between two telescopes of equal aperture

(ii) Must have high directivity (i.e. resolution) to discriminate against light from extraneous sources. This is achieved by using a lens or mirror of long focal length and high optical quality; and a focal plane stop as small as possible consistent with the demands of avoiding diffraction effects, to cut out all parts of the image except that of the transmitting end of the system. The focal plane aperture should also allow for the acceptance of any light from the transmitter around the principal image which results from lens aberrations. A large aperture lens is essential for good resolution. Chromatic aberration is not a problem with the optics of most light beam links, as they are only required to operate over a narrow band of optical frequencies.

Some local optical firms sell 5 inch double-convex magnifying glasses which are mass produced in Japan for about $5 each, and while their optical quality isn't spectacular, they're quite useable for optical communication.

For highest efficiency, the lenses should be coated to reduce internal reflections, though this isn't essential.

Focal length and therefore f/D is not an important consideration in the receiver optics. For a given diameter, a lens will collect the same number of photons no matter what its focal length might be, though long focal length lenses have the advantage of being thinner, and therefore the image becomes less subject to absorption within the lens, as well as chromatice and spherical aberration.

B. TRANSMITTER

For the transmitting end of the link, we want the diameter of the collimating optics to subtend the largest angle possible around the light source, to ensure the maximum radiation of energy.. Directivity is not a critical consideration, and the beam may disperse a little to allow for bending by atmospheric refraction fluctuations. The smallest "f/D ratio" possible is desirable, so that parabolic reflectors, rather than lenses, would seem to be the most suitable choice.

Larger diameter optics are desirable for a number of reasons. Consider the transmitting case, with a light source at the principal focus of two mirrors of equal "f/D ratio" but different diameter. "f/D ratio" is equal to the mirror focal length divided by its diameter, for most practical purposes (i.e. f/D ratio).

Since the mirrors have equal "f/D ratio", both will intercept the same angular cone of light from the source, regardless of diameter. Both will receive the same number of photons per second from the source, despite their differing surface areas.

Since their "f/D ratios" are equal, the large diameter mirror will have a longer focal length than the small diameter mirror. Image size is inversely proportional to focal length, so that the large diameter mirror will give the smaller image, since it has the longer focal length.

Both mirrors are concentrating the same number of photons per second, but since the larger mirror concentrates the image into a smaller area, the large mirror will give the most intense image.

BUT the problem is not as simple as it might seem, because other factors come into consideration, particularly at short focal lengths. When this becomes shorter than mirror diameter, the desired contour of the mirror for maximum received intensity changes, and must be mathematically re-designed to fit different contour functions according to which annulus of the mirror is being considered. Other factors to be considered in this horrifyingly complex mathematical situation include the area of mirror made ineffective by being blocked by the light source, value of finite distance to image and convergence angles from the mirror edges, and a host of other problems.

To cap everything off, "f/D ratio" for mirrors is defined slightly differently than it is for lenses, to allow for the case where the source is physically inside the volume of the convex surface, which occurs for extremely large curvature, short focal length mirrors.

The only rule of thumb which can be given because of these complex factors is that one should tend towards using a mirror of large diameter and not too great effective focal length. At a rough estimate, a focal length approximately the same as the mirror radius would appear to be a useable choice (i.e. f/D = .5).

Large diameter optics are also desirable for maximising the cross-sectional area of the imaginary coupling cone between the transmitting mirror and receiving lens, to average out disruptions which can be caused by raindrops falling through the beam, or birds and insects which may fly through it. A thin beam, such as that coming directly from a laser cavity, could be completely disrupted by a very small obstacle.

LIGHT DETECTORS SUITABLE FOR OPTICAL COMMUNICATIONS SYSTEMS

In choosing the light detection device for a communication system, we must first decide on the frequency of operation. The use of infra-red light, with its fog penetrating properties and large number of available photons per watt would seem a desirable expedient. But detectors which are sensitive to infra-red light are sensitive to heat, requiring expensive and bulky cooling systems to realise maximum sensitivity. The difficulties of focussing and aligning a beam of light which the eye can't see also offers inducement to move up to the visible spectrum, between 4000 and 7000 Angstroms.

Despite recent advances in semiconductor light detection technology, the photomultiplier tube remains the most suitable device for the detection of weak visible light signals a troom temperature. It is particularly useful at the violet end of the spectrum, between 3500 and 5000 Angstroms.

While the silicon avalanche photodiode and the cadmium sulfide photoconductive cell both have higher quantum efficiency in the visible spectrum than the photomultiplier, internal noise and dark current at room temperatures outweighs this attractive feature.

These limitations of the available detection devices, together with the difficulties encountered in detector refrigeration (e.g., window frosting, condensation, potential cracking of the glass envelope) all augurs towards the use of optical communication systems in the 4000 to 5000 Angstrom region, at least for the amateur.

Suitable modulated light sources in this region of the spectrum include the mercury arc lamp, and the argon laser (4880 Angstroms).

Even though photomultipliers require a 1000 volt power supply, their associated circuitry is very simple, their internal gain very high (typically 5×10^6), and their output large. Response speeds reach about 50 MHz on standard designs, and may extend into the GHz region with special design.

Photomultipliers are sold with a range of different photosensitive surface materials, capable of giving responses of peak quantum efficiency in various areas of the visible spectrum. Typical photocathode surfaces suitable for use in the 4000 to 5000 Angstrom region may have peak quantum efficiencies of 25 per cent (see Fig. 8).

This is the number of photoelectrons emitted from the photocathode per incident photon, expressed as a percentage.

Like most photosensitive devices, some cooling of the device is advantageous, though not obligatory. Variation of photomultiplier dark current with temperature for various photocathode substances is shown in the attached graph (Fig. 9). Significant reductions in internal noise may be made by cooling to the temperature of dry ice. Below —40°C little improvement can be attained.

GAS DISCHARGE LAMPS FOR OPTICAL COMMUNICATIONS

The five most common commercially available gas-discharge lamps used for continuous illumination are based on:

1. Fluorescent systems
2. Neon gas
3. Xenon gas
4. Sodium vapour
5. Mercury vapour.

Except for short-range work, fluorescent and neon lamps may be discounted owing to the difficulty of colfimating the light from these sources of large area and low intensity. The neon lamp's total light output in commercially available versions is very limited; and the fluorescent lamp's high frequency response is limited by the persistence of glow in the phosphor coating.

An understanding of the atomic processes involved in gaseous discharge is essential to ta discussion of the relative merits of sodium and mercury lamps.

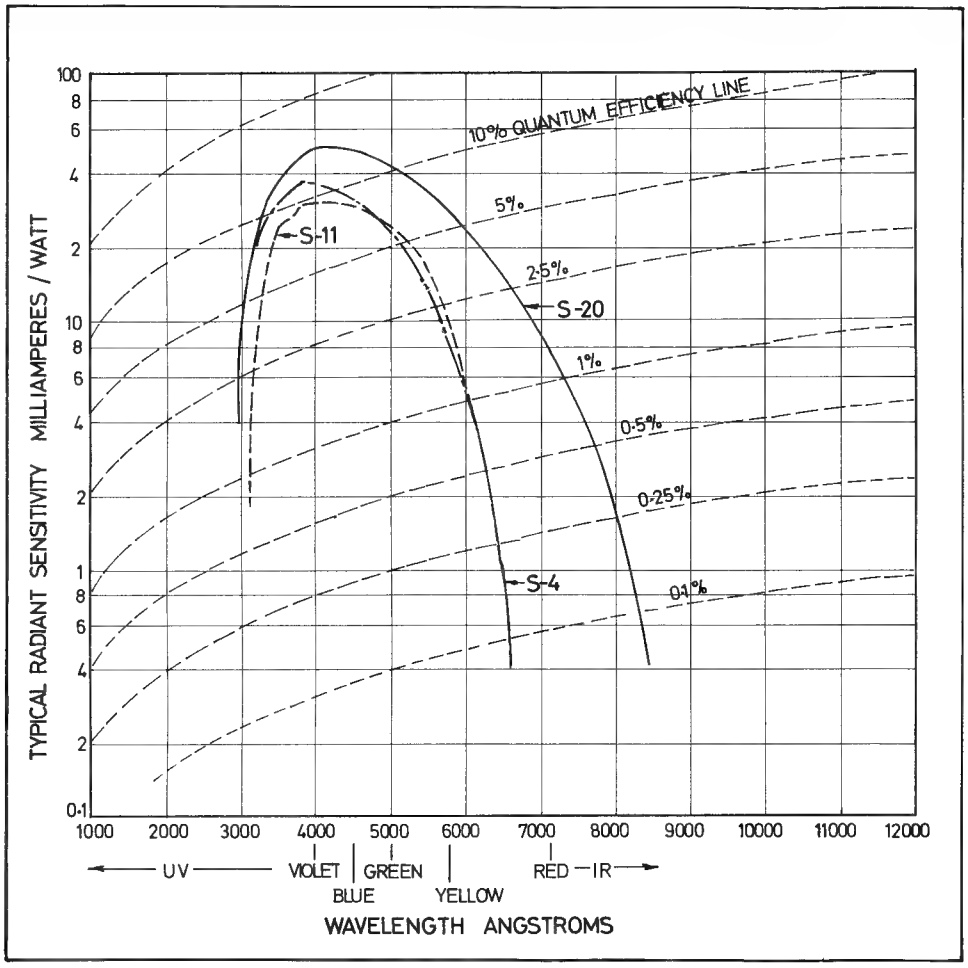


FIGURE 8

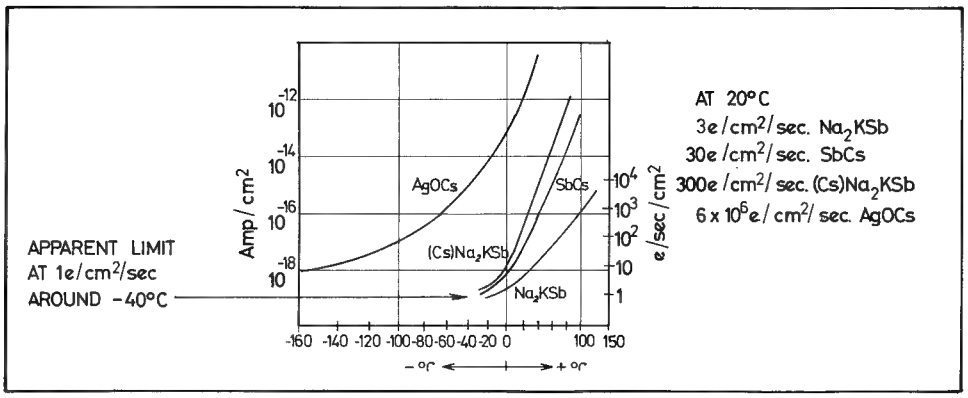


FIGURE 9

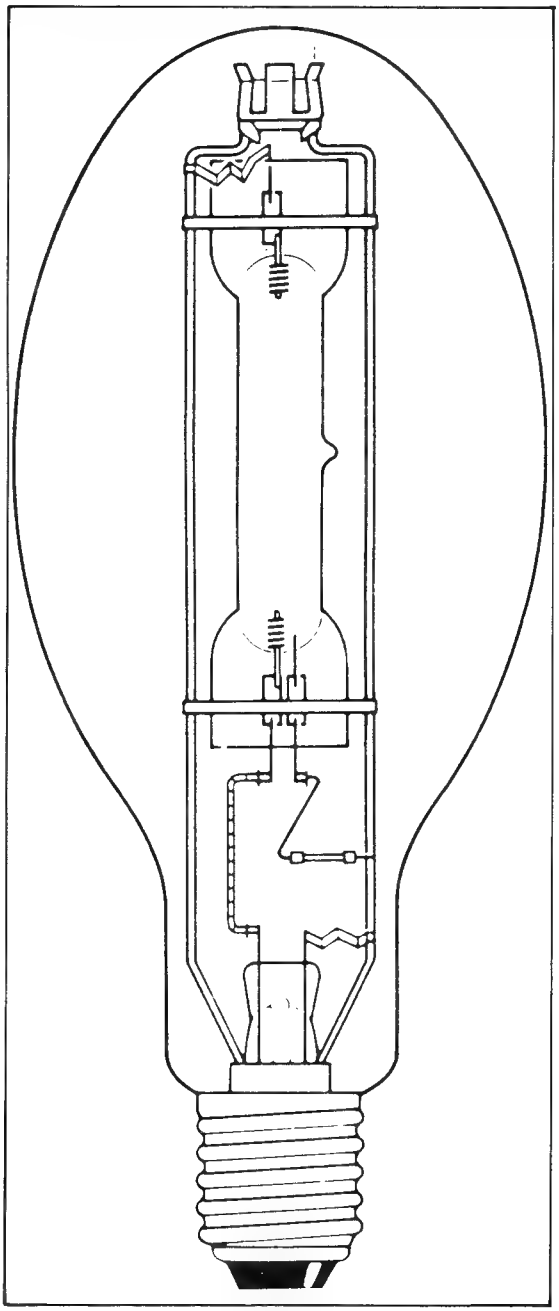


FIG. 10: Super-high pressure mercury lamp showing internal phial containing quartz arc tube.

Light particles or "photons" are absorbed by an atom when the outer electrons of the atom move to an orbit slightly further from the atomic nucleus. The electron may have moved from its unexcited position, known as the ground state; or if previously excited, may move to a larger "permitted" shell. The amount the electron moves is dependent on two factors:

1. The amount of energy absorbed. Photons of high energy will cause a large movement. As photon energy is proportional to frequency, blue light will cause a larger electron displacement than red light.
2. The electron is only capable of moving to certain "permitted" shells within a specified atom. Only the photons of energy equal to the permitted energy level jumps will be absorbed, therefore only light of certain frequencies will be absorbed. This results in the existence of an absorption spectrum which is unique for every substance.

Conversely, if an electron loses energy by falling to a lower energy level closer to the atomic nucleus, this energy loss is emitted in the form of a photon. As with absorption, the light emitted by each substance will occur in a series of frequencies equivalent to the permitted energy level jumps for that substance. Hence we have an emission spectrum.

An electron's transition from a given energy level to ground state produces the "resonance line" emission of the particular substance involved. At this resonance frequency, the gas is capable of selectivity re-absorbing its light output, converting it into transitions between higher energy levels, giving output at lower frequencies. Selective absorption increases with the pressure of the gas in the discharge, so that to promote the emission of the resonance frequencies, the gas must be kept at low pressure. The resonance line is also suppressed at higher discharge current

densities, as the atoms may be excited to higher energy levels before falling back to the ground state by successive excitation of incident electrons. Alternatively, the atom may transfer its energy to an electron without emitting a photon at all.

Therefore, with a sodium vapour discharge, where the resonance lines fall within the visible spectrum at 5890 and 5896 Angstroms, most efficient light outputs are achieved at low gas pressures and low current densities. For this reason, sodium vapour lamps are of low intensity and large source area to give a reasonable light output. So they are not suited to optical communications.

A superior alternative is the super-high pressure mercury lamp. Mercury's resonance lines are at 1850 and 2537 Angstroms in the ultraviolet, so that for visual output, the higher energy level transitions at 4047, 4358, 5461 and 5780 Angstroms are promoted by the use of a discharge at high pressure and high current density resulting in an intense small source area well suited to optical communications (see Fig. 11).

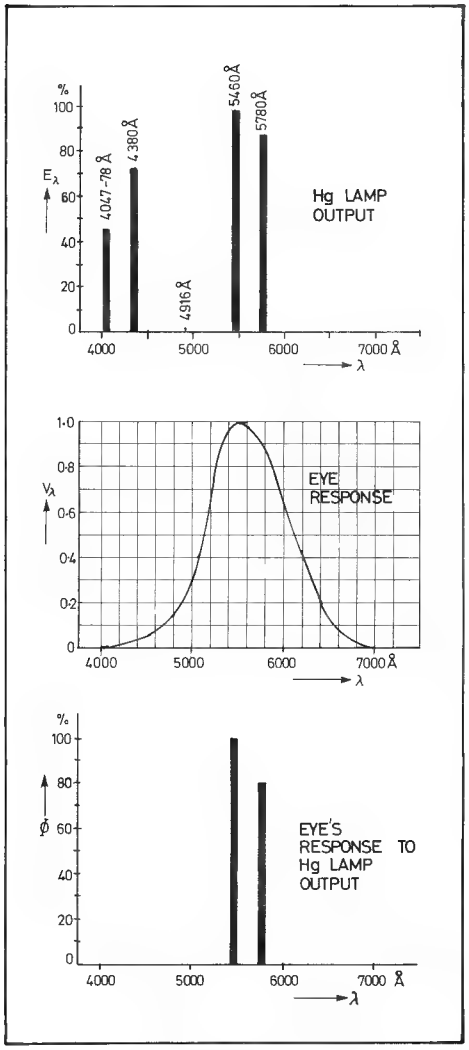


FIGURE 11

In commercially available high pressure mercury lamps the discharge is maintained within a small quartz phial (see Fig. 10). This is usually surrounded by a much larger diffusing bulb sometimes coated with a fluorescent substance to make use of the residual ultraviolet output. For use in optical communication systems the quartz phial must be removed by smashing the outer diffusing bulb, and re-mounting it inside a small clear-walled glass container. This should be done with great care, and **on no account should the quartz arc be operated without an outer protective glass vessel.** The arc emits a very large amount of harmful ultra-violet radiation, which can penetrate the quartz bulb, but which is absorbed by glass.

The mercury discharge strikes at about 180 volts with a light blue glow filling the entire bulb at first, then narrowing to a thin blue-green arc of high intensity as the quartz bulb warms up and the mercury pressure increases through conversion to vapour by the heat of the arc. It generally takes about 15 minutes for the lamp to reach its final intensity. In that condition, the arc can be modulated up to about 20 or 30 kHz.

A disadvantage of this type of light source is that after it has warmed up, its striking voltage increases to such an extent that it is impossible to restrike if it happens to go out on a modulation peak, unless it is left to cool for a few minutes.

The use of a feedback circuit and a negative peak clipper in the modulator is suggested, to ensure that the arc is never completely extinguished by modulation peaks. Non-linearity of modulation may be corrected by positioning a photodiode near the arc, and connecting it to the modulator in a negative feedback loop.

The mercury lamp used must be derated to run in AM service with DC bias. To run at a continuous 30 watt output, for instance, a 60 watt lamp rating is required, to take care of peak power output under fully modulated conditions.

Another factor to be taken into account in the derating requirements is that most electrode heating is at the cathode end of the tube, owing to ionic bombardment. With AC operation, where the cathode is effectively switching rapidly from one end of the tube to the other, the heating effects are shared between the two electrodes. With DC operation, most of the heating effect takes place at one end of the tube, increasing the dissipation requirements over that for AC operation.

Arc polarity should be reversed from time to time to prevent the excessive ion bombardment of one electrode. To overcome this problem, RF bias could be tried.

The modulator should include some method of controlling the DC bias current through the arc, and metering to measure arc voltage and current, as these parameters drift considerably with changes of ambient temperature and modulation conditions. If arc current is not monitored, it could drift upwards beyond the dissipation ratings of the lamp and the modulator tubes.

THE PHOTOPHONE — 1881 — AN EARLY EXPERIMENT

With such an arrangement of apparatus speech has been conveyed beyond ordinary speaking distances, and Bell explained to the members of the American Association for the Advancement of Science at Boston how Tainter and he had made a successful experiment over a distance of about 700 feet. It was in Washington, and Mr. Tainter worked the transmitting instrument on the top of the Franklin school-house, while Bell was at his laboratory in 1325 L. Street with the sensitive receiver arranged in one of the windows. While his friend was at work at the distant schoolhouse, Bell applied the telephone to his ear, and heard distinctly from the illuminated receiver the words — "Mr. Bell, if you hear what I say, come to the window and wave your hat." In relating this incident subsequently to an English audience, Professor Bell remarked that he need hardly say with what gusto he rushed to the window and made the required signal.

Assuming that the beam angles are very much smaller than the angle between the beam and the line joining the two sites, and considering the simple tangent case where the transmitted and received beams are tangent to the earth and the scattering medium is conveniently at the beam intersection, then the minimum height of the cloud must be:

$$H\,min = Re\left(\frac{1}{\cos\theta} - 1\right)$$

where Re is the radius of curvature of the earth. For small θ this equation is

$$H\,min = Re\,\frac{\theta^2}{2}$$

If the scattering medium is less than H min it will be below the horizon for both receiver and transmitter. A longer value of H min means a decreased scattered intensity.

Energy level diagrams of sodium and mercury. The thickness of the lines indicates the visibility of the radiation. Invisible (ultra-violet or infra-red) radiation is shown by dotted lines. Vi is the ionisation voltage. In the case of sodium the visible light is produced mainly by the resonance lines (5890 96A); the higher level transitions are chiefly in the infra-red zone. The visible light produced by mercury is in the main due to the higher transitions (chiefly 5461 and 5791 A); the resonance lines (1850 and 2537 A) are ultra-violet.

Distribution of relative spectral energy and luminous flux of an HP 125W super high pressure mercury lamp in the visible zone. In the distribution of the energy, as in that of the luminous flux, the value of the strongest line is arbitrarily taken to be 100.

CONCLUSIONS

For amateur use, optical communication offers a cheap alternative to microwave systems for point-to-point communication.

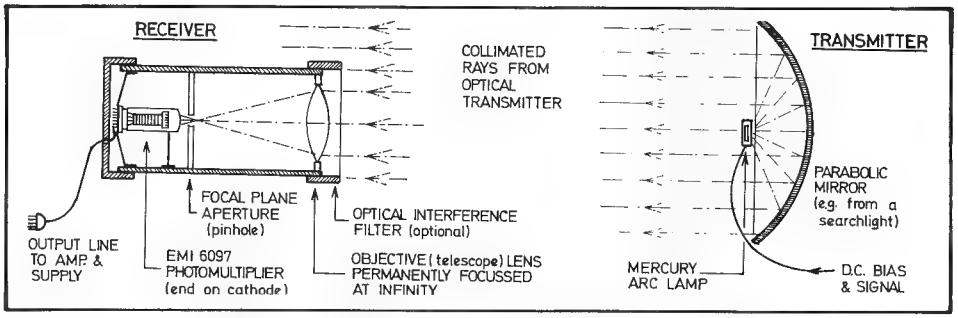

RECEIVER
TRANSMITTER
COLLIMATED RAYS FROM OPTICAL TRANSMITTER
PARABOLIC MIRROR (e.g. from a searchlight)
FOCAL PLANE APERTURE (pinhole)
OPTICAL INTERFERENCE FILTER (optional)
OUTPUT LINE TO AMP & SUPPLY
EMI 6097 PHOTOMULTIPLIER (end on cathode)
OBJECTIVE (telescope) LENS PERMANENTLY FOCUSSED AT INFINITY
MERCURY ARC LAMP
D.C. BIAS & SIGNAL

FIG. 12: Optical system for modulated visual light communication

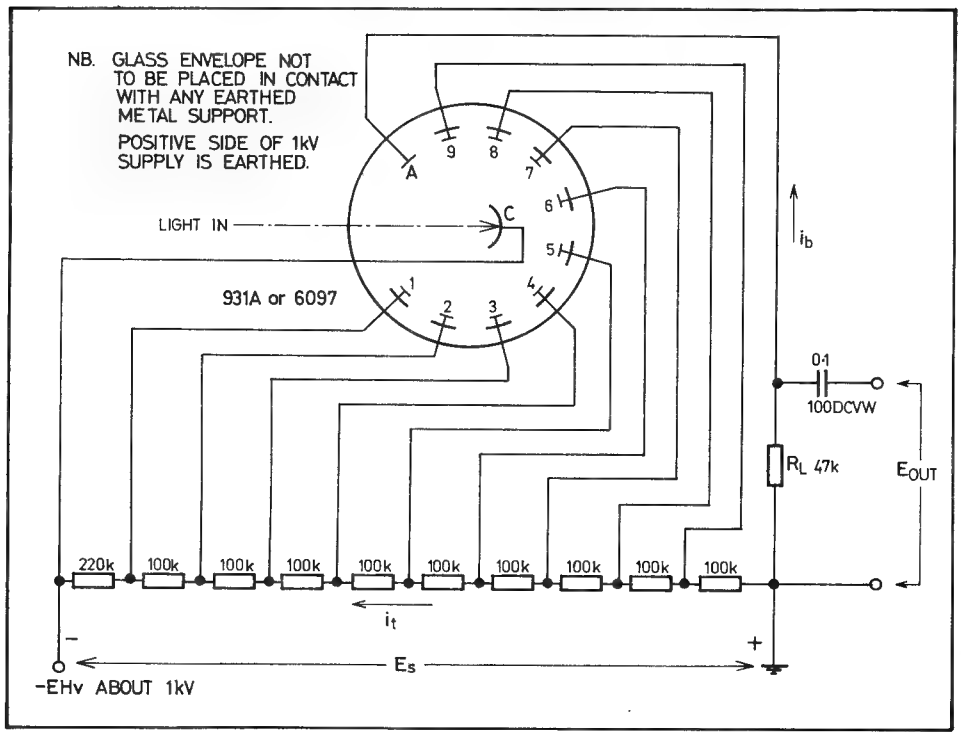


FIG. 13: Photomultiplier Circuit

It can also be used for omni-directional transmission over short distances.

Simpler transmission systems, requiring less than, say, 50 kHz bandwidth, may use any readily modulated light source. Short range systems may employ light emitting diode sources which, except for the green phosphor-activated type, have a linear modulation characteristic, and are readily internally modulated at low voltages. Long range systems could use modulated high intensity gas discharge lamps, carbon arcs, gas lasers or solid state lasers. A coherent (i.e. laser) light source is not mandatory ,and may prove to be economically unjustified where bandwidth and background radiation are not critical considerations.

Optical communication ranges through the atmosphere can extend to over 100 miles and may be stretched beyond the horizon by the use of cloud scatter in favourable conditions. There has been little quantitative experimentation over these distances, despite the relative ease with which they can be achieved.

The system outlined here, using modulation of the power supply to a mercury arc, and a 6097 photomultiplier receiver, is only one of many alternative schemes for use at visual frequencies. Its effectiveness, in spite of its simplicity, indicates that the time is ripe for a substantial upsurge in amateur interest in such systems (see Figs. 12 and 13).

LEGALITY OF OPTICAL COMMUNICATION EXPERIMENTS IN AUSTRALIA

While this article was being written, I approached the Regulatory and Licensing Section of the Postal and Telecommunications Department, and made enquiries regarding the licensing of the system outlined here. Mr. Ditchburn of the Victorian

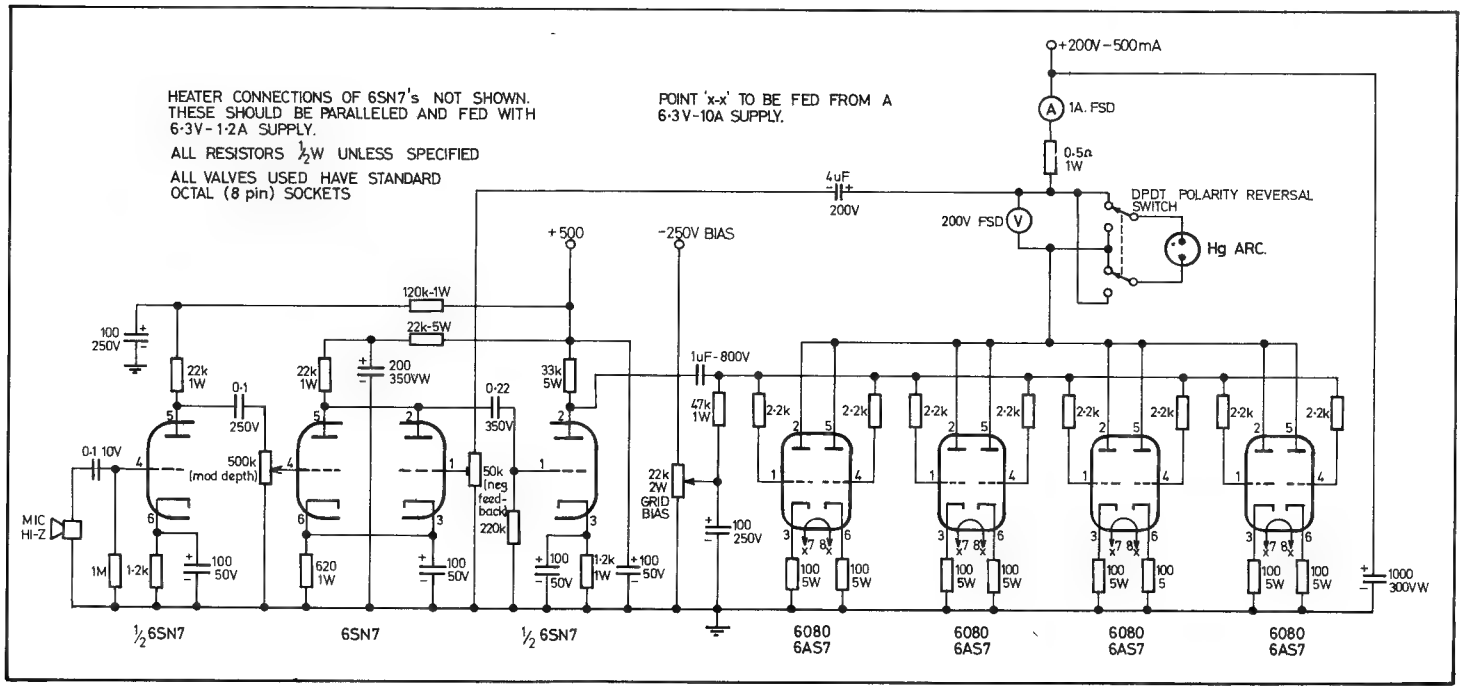


FIG. 13 'A': Arc modulator

branch assured me that while there is no licence covering such equipment, permits are available for such devices under the terms of the Wireless Telegraphy Act at no charge to the applicant. I have been given the verbal assurance that while my written application is being processed, I may proceed with my present experiments without fear of legal action. An amateur radio licence is not required in addition to the permit.

Chris has now received from the P. and T. an official permit to experiment in this system. —Ed.)

ACKNOWLEDGEMENTS

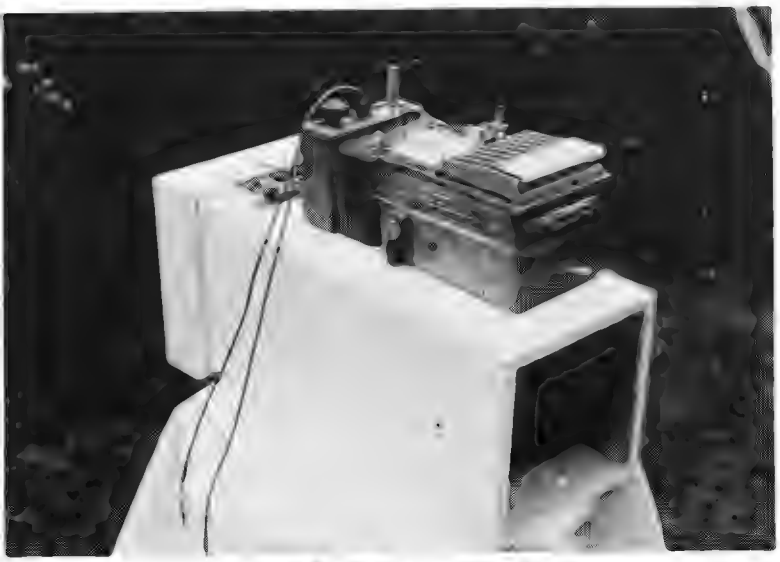
— Assistance with field tests and equipment, courtesy John Eggington VK3ZGJ.
— Assistance with research on optics, courtesy R. A. J. Reynolds VK3AAR.
— Graph of response curves of photodiodes, courtesy of Proceedings of IEEE, October 1970.
— Graphs of photomultiplier response curves and noise dependance on temperature, courtesy EMI Photomultiplier Applications Manual and HTV Photosensitive Devices Catalogue.

SUGGESTED READING

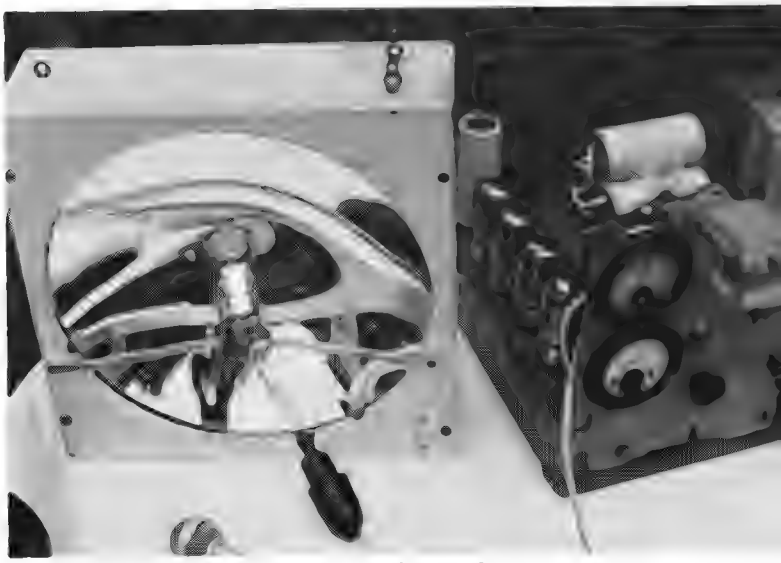
— Laser Receivers, by Monte Ross. Published by John Wiley & Sons, 1966.
— RCA Photomultiplier Manual.
— A Review of Operational Laser Communication Systems, by F. E. Goodwin. Proceedings of the IEEE, vol. 58, pp. 1746-1752. October 1970.
— Modulators for Optical Communication, by Fang-Shang Chen. Proceedings of the IEEE, vol. 58, pp. 1440-1457. October 1970.
— Photodetectors for Optical Communication Systems, by Melchior, Fisher and Arams. Proceedings of the IEEE, vol. 58, pp. 1466-1486. October 1970.
— Modulated Light Communication, by K. Burlinson. Australian EEB, Aug. '68, Feb. '70, Aug./Oct. '72, Dec. '72.

Chris Long with light transmitter, arc modulator and power supply.

Close-up of modulator



Receiver with power supply



Close-up of transmitter

Photomultiplier receiver

Photographs for AR DON'T KEEP THEM TO YOURSELF Send them in — NOW

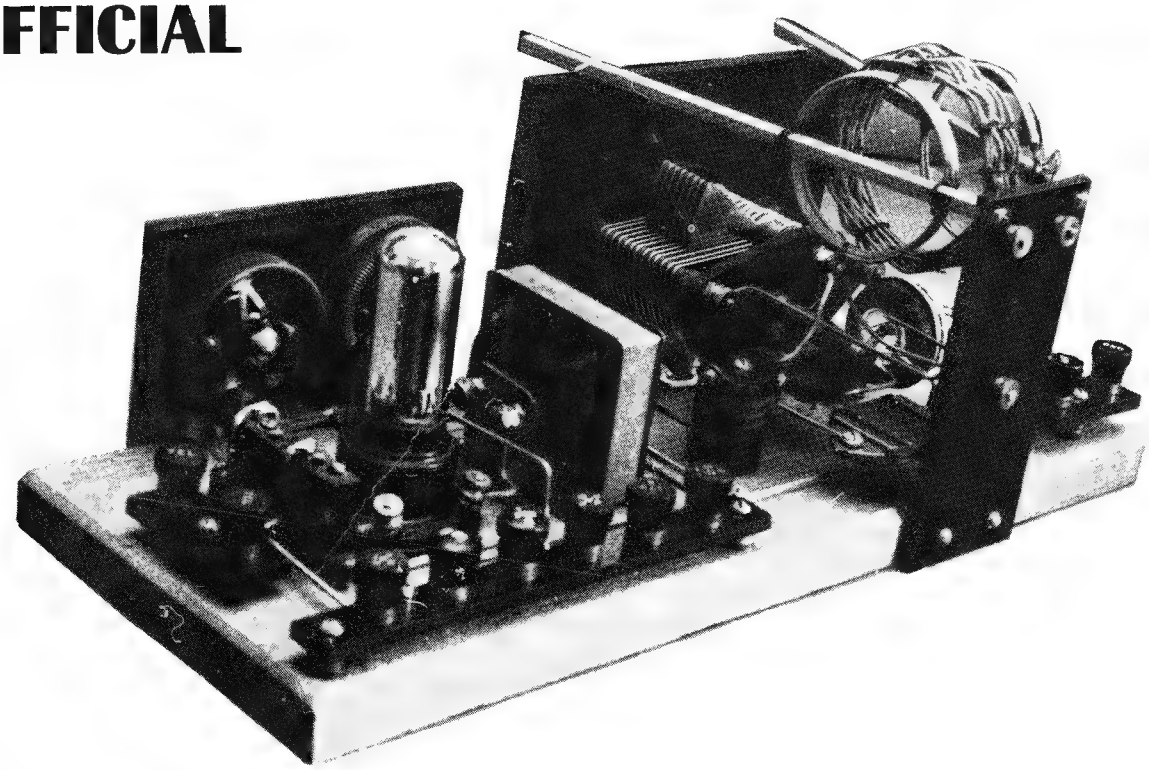
UNFINANCIALS — REMINDER

Next month's AR is your last issue unless you pay your 1979 subscription promptly. This could include new members from last year owing an amount to render them financial to 31.12.1979.

SOME UNOFFICIAL HAM HISTORY

Geoff Thompson VK3AC
78 Illawarra Road, Hawthorn 3122.

Recently Group Captain E. R. (Bon) Hall, formerly the OC of the RAAF School of Radio, published his well researched book covering a history of RAAF Radio "A Saga of Achievement". The book brought to mind those early days of ham radio when a zealous bureaucrat said "Put them (the hams) below 200 metres — they won't be able to get out over the back fence down there". Of course we all know what happened when the hams lost the LF and MF parts of the spectrum. They were forced as a result into unknown territory where they pioneered DX communication and as a result commercial interests were quick to see the value of the HF spectrum.



The replica of the two valve "low loss" receiver built by Gil Miles in 1924 and which is now a part of the historical radio section at Melbourne's Science Museum.

The receiver used "air-wound" coils, employed a regenerative detector and a transformer coupled audio stage using a UV199 valve. The base was removed from the detector valve to reduce losses.

The simple little receiver started the RAAF with the use of the HF frequencies at a time when they were thought to be almost useless. Hams knew differently and as a result of their experimentation, commercial interests were quick to follow in the hams' foosteps.

What has all this to do with Bon's book? Well the Science Museum of Victoria has on permanent display an early two valve "low loss" HF receiver which is an exact replica of one built by Gil Miles VK2KI in 1924. Gil was originally licensed as a ham in 1919. When he retired from the Radiophysics Division of the CSIRO, Gil went on the air again under his present call. In those early days of radio, Gil was a keen ham and when he joined the RAAF as an Aircraftsman Engine Fitter, his ham radio experience was to prove history making. Gil's OC of No. 1 Squadron was Flt. Lt. Arthur Cobby, who was later to earn many decorations in the Second World War and who became an Air Commodore. Gil had heard the MacMillen expedition in the Arctic on his two valve receiver and mentioned it to Cobby. The expedition ship the "Bowden" was located off Greenland and an American ham, Don Mix W2TS, using the call WNP, was communicating regularly with hams at home and elsewhere. Cobby was a little dubious about Gil's claims so the little receiver was set up in his quarters at Point Cook and that evening Gil was able to receive WNP and copy the text of the material being transmitted by the expedition.

The unofficial historical moment had now arrived when Cobby asked Gil what it would cost to set up a transmitter which could communicate with the RAF in Britain. Gill said he could produce the transmitter for about £80. Cobby then transferred Gil to the Squadron's wireless section and with the assistance of Flt. Sgt. Barfield, the equipment was soon in operation and contact was made with the RAF. It was a year later that the RAAF commenced using the HF part of the spectrum with a receiver which was a replica of the little two valve job Gil had demonstrated to Cobby. Cobby, possibly because of reasons of protocol, never claimed the credit for that historical event, but for Gil it got for him a whole string of flying experiences.

As an engine fitter, plus radio experience and a knowledge of morse, he was the one who had most of the opportunities on various flights in machines which could only carry one passenger. Needless to say, this aroused a certain amount of jealousy. This prduced one humorous episode in which Gil turned the tables. The RAAF, using two seaplanes, made an island hopping flight across Bass Strait to Tasmania during the survey of a proposed air mail route. Gil flew in one of the sea planes. Signals from Point Cook were last heard as the planes passed across Mornington. Gil couldn't raise the base at all after that but resourcefully he shifted to 600 metres where the obliging operator at VIM in the Domain, took his messages on the quarter hour and relayed them to the Navy Office a short distance away from the Domain station. Then when the VIM op. became busy he suggested to Gil that he call Flinders Island Radio VIL and he would no doubt be able to carry on handling the quarter hourly report from the seaplanes. This worked out well and all messages reached HQ. On the return journey signals from Base suddenly appeared again as they passed over Mornington. Was it gremlins, or was it that old green eyed monster? Hi.

There are many old-timers around with similar stories to tell about the contribution made by hams in the early days of radio. Perhaps some of them might be drawn out so that their experiences could be placed on record. Someone once said years ago "many a ham, after developing some improvement on his little rig at home, has gone to work next day and modified a high powered multi kilowatt commercial transmitter as a result". Maybe those days have now gone, but behind the scenes still, hams with their innovative approach to electronics are still making valuable contributions behind the scene.

If you know of similar stories to the one I have related, they should at this time be recorded because in some quarters ham radio is considered to be simply a fun thing without much to support its existence. We all know differently, but if we don't publish, how will the bureaucrats know. ■

OSCAR 8 READY-RECKONER

Ian O'Toole VK2ZIO
22 Leysdown Ave., North Rocks, NSW 2151

The recent launch of Oscar 8 has now enabled low power stations to make use of Mode A. Perhaps the most difficult problem in working Oscar is to know when to listen. Many articles have been published in this magazine describing appropriate formulae and methods. The actual process of working out pass times is not difficult, but it certainly is tedious.

You don't need a digital system driven by electromotive force and a floppy disc, the digit (fingerstrong method) driven by your own energy perhaps supported by a floppy wrist is really all that is required.

With in excess of 2,500 possible combinations of bearings and times to be encountered on the first GMT equator crossing of the day, some rationalizing of method is desirable.

The proposed system, through the use of tables, enables the raw data, as supplied by AR, to be quickly converted to meaningful data, allowing you to decide on the usefulness of the orbit, as well as providing the acquisition time in your local time.

It is proposed to work an example through as the tables are introduced.

RAW DATA:

Amateur Radio, May 1978, Page 30, Oscar 8 Information Supplied:

Orbit	Date	Time Z (GMT	Long (deg. W)
1023	18	0111	59.9

The orbit number and date are not required for our purposes here, the important data is the time and longitude.

Work through the longitude table first. From this you can determine if it is worthwhile trying to use the sattelite. The table gives longitudinal crossings (also called ascending nodes) for the evening orbits of interest, numbers 5, 6, 7 and 8 of the GMT day.

USING TABLE 1

With supplied longitude of 59.9 deg., look up 60 degrees along the top of the columns. A first time crossing of 60 degrees results in the following later longitudes (go down the column), orbit 5 163 deg., orbit 6 189 deg., orbit 7 215 deg. and orbit 8 241 deg.

The easiest orbit to work is the one directly overhead. Check the next set of figures to see if any of the selected orbits would show promise.

If you are trying Oscar 8 for the first time, try an orbit that does not deviate more than 10 degrees from overhead. You should have no problem putting a signal into the satellite. Hence, orbit 6, 189 degrees, should be useful in Sydney, Melbourne, Hobart and Brisbane, while it would not be regarded as "good" in

TABLE 1: PREDICTED LONGITUDES OF EVENING ORBITS OSCAR 8 LONGITUDE OF FIRST CROSSING OF GMT DAY

Orbit No.	(°) 42	43	44	45	46	47	48	49	50	51	52	53	54	55
5	146	147	148	149	150	151	152	153	154	155	156	157	158	159
6	171	172	173	174	175	176	177	178	179	180	181	182	183	184
7	197	198	199	200	201	202	203	204	205	206	207	208	209	210
8	223	224	225	226	227	228	229	230	231	232	233	234	235	236

LONGITUDE OF FIRST CROSSING OF GMT DAY

Orbit No.	(°) 56	57	58	59	60	61	62	63	64	65	66	67	68
5	159	160	161	162	163	164	165	166	167	168	169	170	171
6	185	186	187	188	189	190	191	192	193	194	195	196	197
7	211	212	213	214	215	216	217	218	219	220	221	222	223
8	237	238	239	240	241	242	243	244	245	246	247	248	249

ASCENDING NODES GIVING APPROXIMATE OVERHEAD PASSES IN CAPITAL CITIES (in degrees)

Sydney	Melbourne	Adelaide	Hobart	Perth	Brisbane
86	192	198	190	220	183

TABLE 2: FIRST GMT DAY CROSSING TIMES AND CROSSING TIMES FOR EVENING ORBITS AT THE EQUATOR (EXPRESSED IN MINUTES GMT)

Orbit No.	0000	0001	0002	0003	0004	0005	0006	0007	0008	0009	0010	0011	0012
5	413	414	415	416	417	418	419	420	421	422	423	424	425
6	516	517	518	519	520	521	522	523	524	525	526	527	528
7	619	620	621	622	623	624	625	626	627	628	629	630	631
8	723	724	725	726	727	728	729	730	731	732	733	734	735

MINUTES GMT

Orbit No.	0013	0014	0015	0016	0017	0018	0019	0020	0021	0022	0023	0024	0025
5	426	427	428	429	430	431	432	433	434	435	436	437	438
6	529	530	531	532	533	534	535	536	537	538	539	540	541
7	632	633	634	635	636	637	638	639	640	641	642	643	644
8	736	737	738	739	740	741	742	743	744	745	746	747	748

MINUTES GMT

Orbit No.	0026	0027	0028	0029	0030	0031	0032	0033	0034	0035	0036	0037	0038
5	439	440	441	442	443	444	445	446	447	448	449	450	451
6	542	543	544	545	546	547	548	549	550	551	552	553	554
7	646	647	648	649	650	651	652	653	654	656	657	658	659
8	749	750	751	752	753	754	755	756	757	758	759	760	761

MINUTES GMT

Orbit No.	0039	0040	0041	0042	0043	0044	0045	0046	0047	0048	0049	0050	0051
5	542	453	454	455	456	457	458	459	460	461	462	463	464
6	555	556	557	558	559	560	561	562	563	564	565	566	567
7	658	659	660	661	662	663	664	665	666	667	668	669	670
8	762	763	764	765	766	767	768	769	770	771	772	773	774

Orbit No.	MINUTES GMT 0052	0053	0054	0055	0056	0057	0058	0059	0100	0101	0102	0103	0104
5	465	466	467	468	469	470	471	472	473	474	475	476	477
6	568	569	570	571	572	573	574	575	576	577	578	579	580
7	671	672	673	674	675	676	677	678	679	680	681	682	683
8	775	776	777	778	779	780	781	782	783	784	785	786	787

Orbit No.	HOURS AND MINUTES GMT 0105	0106	0107	0108	0109	0110	0111	0112	0113	0114	0115	0116	0117
5	478	479	480	481	482	483	484	485	486	487	488	489	490
6	581	582	583	584	585	586	587	588	589	590	591	592	593
7	684	685	686	687	688	689	690	691	692	693	694	695	696
8	788	789	790	791	792	793	794	795	796	797	798	799	800

Orbit No.	HOURS AND MINUTES GMT 0118	0119	0120	0121	0122	0123	0124	0125	0126	0127	0128	0129	0130
5	491	492	493	494	495	496	497	498	499	500	501	502	503
6	594	595	596	597	598	599	600	601	602	603	604	605	606
7	697	698	699	700	701	702	703	704	705	706	707	708	709
8	801	802	803	804	805	806	807	808	809	810	811	812	813

Orbit No.	HOURS AND MINUTES GMT 0131	0132	0133	0134	0135	0136	0137	0138	0139	0140	0141	0142	0143
5	504	505	506	507	508	509	510	511	512	513	514	515	516
6	607	608	609	610	611	612	613	614	615	616	617	618	619
7	710	711	712	713	714	715	716	717	718	719	720	721	722
8	714	815	716	817	818	819	820	821	822	823	824	825	826

TABLE 3: CORRECTION TIMES TO BE ADDED TO TIME EXTRACTED FROM TABLE 2

(Adapted from Amateur Radio, October 1972 Insert)

Selected Orbit Bearing	Sydney	Melbourne	Adelaide	Hobart	Perth	Brisbane
155	90	—	—	87	—	90
160	88	88	—	87	—	90
165	87	87	90	85	—	88
170	87	87	88	85	—	88
175	87	85	87	83	—	87
180	85	85	87	83	—	87
185	85	85	87	83	—	87
190	85	83	87	83	90	87
195	85	83	85	81	88	87
200	85	83	85	81	88	85
205	85	83	85	81	87	85
210	83	83	83	81	87	85
215	83	83	83	81	87	85
220	83	83	83	81	85	87
225	83	81	83	81	85	87
230	83	81	83	80	85	87
235	83	81	83	80	85	—
240	—	81	83	80	85	—
245	—	81	83	80	85	—

Adelaide. Orbit 7, 215 degrees, would be reasonably close to an overhead pass in Perth. If you wish to study the positions of passes an dhow to interpret them, see the insert in AR for October 1972 and later articles.

Now you have established if a suitable orbit exists. If the orbits don't suit, try the above process on another night schedule. If you have found a suitable orbit, go back to the raw data and find the predicted time of the first equator crossing. Look at Table 2 until you find the crossing time, then look down the column until you find the time in GMT Minutes when your selected orbit crosses the equator. Using orbit 6, 189 degrees, by finding the column headed 0111 (the crossing time), look down to orbit 6 and you will find that 587 GMT minutes have elapsed since the satellite first crossed the equator after the beginning of the GMT day.

We now have to ADD a correction time to the 587 minutes, as the satellite has to travel over the North Pole, go down the opposite side of the earth to us and then approach us heading north west from the South Pole.

Use table 3 to find the number of minutes to be added on.

With an orbit 6 bearing of 189 degrees, if I was in Sydney, the amount of time to be added to 587 would be 85 approx. Hence the satellite should first be heard around 587 + 85 = 672 minutes GMT.

In Melbourne it should be heard 2 minutes earlier, i.e. 587 + 83 = 670.

The final step is to go to table 4, which converts the GMT minutes back to standard time. You will see that 672 GMT minutes is 9.12 EAST etc.

I hope the tables will give help to those who wanted to try the satellite, but were a little confused with working out acquisition times.

Remember, the satellite doesn't wait if you are running late. It is always better to be a few minutes early, just in case! See you on Oscar 8!

TABLE 4: TIME CONVERSION: GMT MINUTES TO AUSTRALIAN LOCAL

Minutes GMT	Eastern Standard	Eastern Daylight	SA/ NT	WA
480	6.00	7.00	5.30	4.00
490	6.10	7.10	5.40	4.10
500	6.20	7.20	5.50	4.20
510	6.30	7.30	6.00	4.30
520	6.40	7.40	6.10	4.40
530	6.50	7.50	6.20	4.50
540	7.00	8.00	6.30	5.00
550	7.10	8.10	6.40	5.10
560	7.20	8.20	6.50	5.20
570	7.30	8.30	7.00	5.30
580	7.40	8.40	7.10	5.40
590	7.50	8.50	7.20	5.50
600	8.00	9.00	7.30	6.00
610	8.10	9.10	7.40	6.10
620	8.20	9.20	7.50	6.20
630	8.30	9.30	8.00	6.30
640	8.40	9.40	8.10	6.40
650	8.50	9.50	8.20	6.50
660	9.00	10.00	8.30	7.00
670	9.10	10.10	8.40	7.10
680	9.20	10.20	8.50	7.20
690	9.30	10.30	9.00	7.30
700	9.40	10.40	9.10	7.40
710	9.50	10.50	9.20	7.50
720	10.00	11.00	9.30	8.00
730	10.30	11.10	9.40	8.10
740	10.20	11.20	9.50	8.20
750	10.30	11.30	10.00	8.30
760	10.40	11.40	10.10	8.40
770	10.50	11.50	10.20	8.50
780	11.00	12.00	10.30	9.00
790	11.10	12.10	10.40	9.10
800	11.20	12.20	10.50	9.20
810	11.30	12.30	11.00	9.30
820	11.40	12.40	11.10	9.40
830	11.50	12.50	11.20	9.50
840	12.00	1.00am	11.30	10.00

NOTE: The calculations are based on a satellite period of 103.232 minutes and a longitudinal increment of 25.81 degrees. ■

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10	YD-844A	Base Microphone
11	YP-150	Dummy Load
12	SP-101	Extension Speaker for FT-101E
13	FT-101E	HF Transceiver
14	YC-601B	Digital Counter for FT-101E
15	YC-500S	Frequency Counter
16	FT-227	2 metre FM Transceiver
17	FT-7	HF mobile Novice Transceiver
18	QTR-24	World Clock
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TASMANIAN AMATEUR RADIO CONVENTION, 1978

Story and photographs by —
Tom Moffat VK7TM
39 Pillinger Drive, Fern Tree, Tas. 7101

TARC '78 was held Hobart's College of Advanced Education over the weekend of November 4 and 5, after months of careful planning. In Tasmania the yearly conventions, or hamfests, are hosted by the three State branches of the WIA in rotation, the North, the Northwest, and then the South, so each branch organizes one every three years.

There's obviously a bit of competition among the branches to try to out-do each other, and the last one Hobart organised was a miserable flop.

Convention Committee Chairman Greg Noble VK7FT and his committee of nine were determined that this wasn't going to happen again, so they started planning seriously more than six months ago. The planned venue was changed several times because of space problems, so eventually it was decided to hold TARC 78 at the Mt. Nelson campus of the College, situated about 4 miles from the centre of Hobart.

There were a few problems to overcome, after all the place is a school and more or less open to the public.

But an area of the main administration block was set aside, which had plenty of display space, and also the advantage of a cafeteria nearby as well as a theatrette where children's films could be shown.

So the TCAE was a bit of an experiment, since most other hamfests had been held in country halls.

The whole experience turned out to be an eye opener.

As each amateur arrived he was greeted at the registration desk and given a beautifully produced convention program, with the front cover done on Viewgraph transparency material to resemble a PCB layout.

Past the registration desk the building is split up into various levels and areas, separated by stairways and railings; so the operating equipment was in one area, the static displays in another, kids creche in yet another.

The impact was one of modern, expensive, spaciousness. After all, the college cost several million dollars to build.

Most of the home brew equipment was displayed in tall perspex cases, which gave it protection from prying fingers.

A bit of a shame in a way, because home brew equipment should be seen to be working before it can be judged for quality.

There are lots of projects, as we all know, that look nice but don't work.

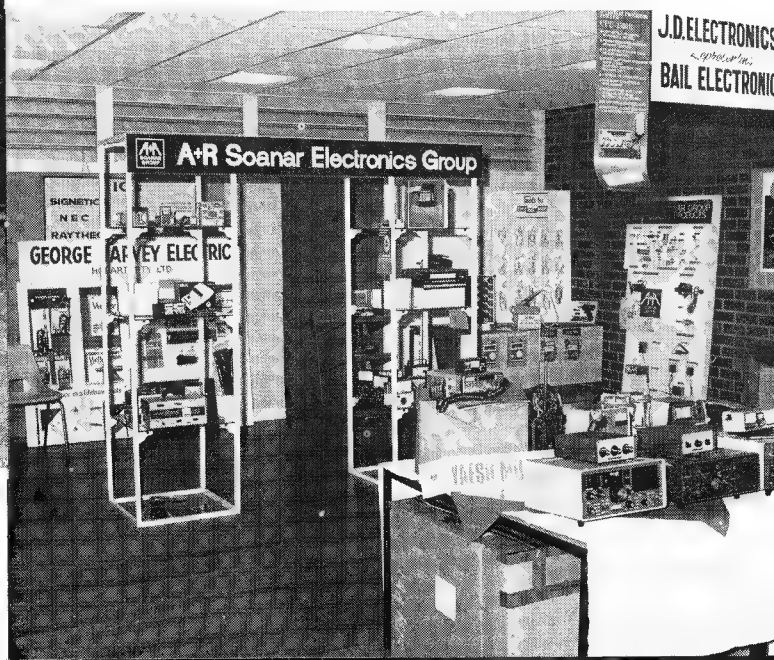
The convention station, AX7WI, was set up on two long tables, with all aerial cables carefully routed out of the building in such a way that no one would trip over them.

The station operated on most licensed frequencies, with some of the most modern gear.

One particularly striking feature was a commercial video display unit and RTTY/Morse unit, a "glass teletype".

"Wag" Adeline and Terry VK7CT, both are very active in WIA affairs

Another nicely laid out commercial display area

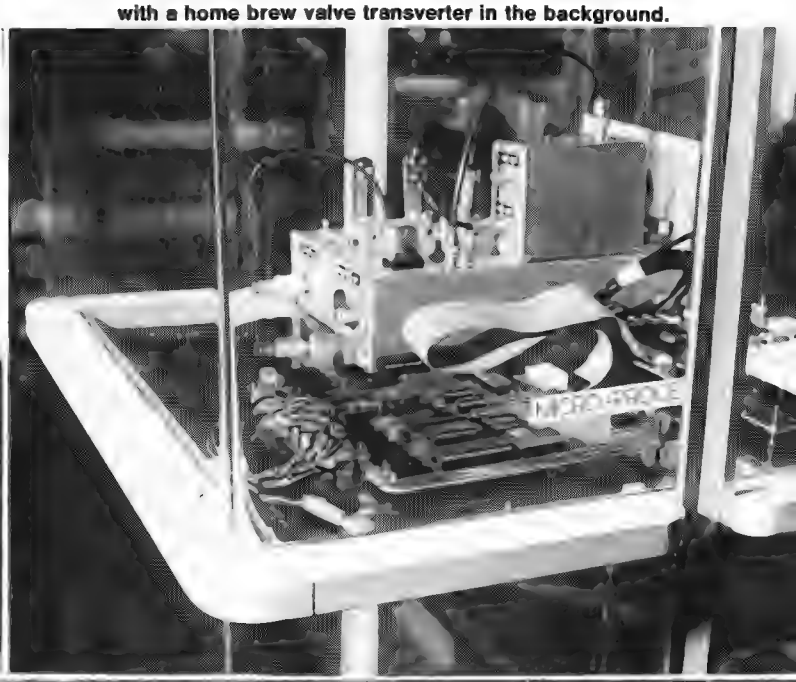


AX7WI. Operation goes on as the child in the centre discovers the joys of a video teleype terminal.

AX7WI in action. Graham VK7GD at the mic.

Greg VK7FT shows Mike VK7ZMK Convention programme. Michelle Burnett looks on. Over 800 people attended.

The old and the new. Home brew microprocessor with a home brew valve transverter in the background.



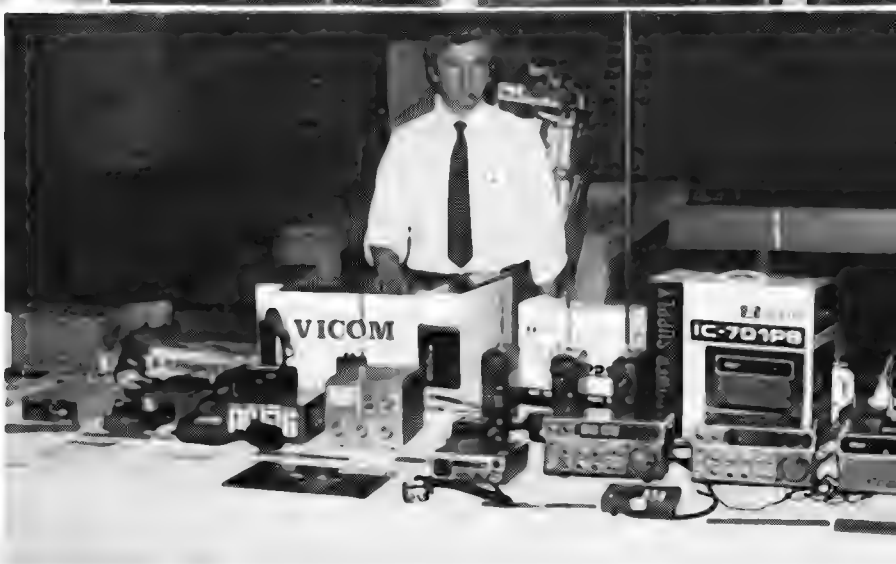
It was interesting to see it taking CW and displaying characters on the screen, although most of us were slightly ahead of it copying by ear (wishful thinking Tom—Ed.).

It had switchable speeds and shifts for teletype, so for several hours on Sunday it was left to copy test messages from Casey Base in Antarctica, just outside the 20 metre band.

The convention was a tremendous public relations coup for amateurs and the WIA.

It was open to the public on Saturday afternoon, and radio enthusiasts and CBers flooded through to be given the "soft sell" good word on becoming a licensed amateur.

Part of this may have been because of the publicity given to the convention in the local paper, and on ABC radio's "what's on" segment on the Saturday morning.



Harvey Skeggs VK7HK at Icom stand.

The whole works were capped off by a cabaret on Saturday night, said to be one of the best ever.

So perhaps TARC 78 was the start of the new breed of conventions, as opposed to "hamfests".

Not one word of criticism could be levelled at the organisers, it went like clockwork, everything worked as planned, and everyone went home happy.

But maybe now is the time to mourn the passing of the old-style "hamfest".

Gone this year was the rough-and-ready atmosphere of the country hall, the "hams" baskin gin the sun near the front door sipping beer as the kids played in the grass or on the beach.

The impromptu mini-conventions in caravans or on the tail gates of station wagons as participants argued over the niceties of aerial design or the best way to work DX.

Gone was being woken up in the morning by a horse snorting through the open window of your caravan, or the fellow in the next van brushing his teeth in beer.

And gone was the big slap-up barbecue on Sunday afternoon, with hams, kids, wives, girlfriends, and dogs all gorging themselves on country sausages and steaks.

Gone were the fox hunts that finish up with the fox hiding in the ladies loo.

But maybe that's progress.

Perhaps the solution would be to have two get-togethers during the year, one a big glossy convention, open to the public, with the best equipment displayed, and every opportunity to freshen up one's knowledge on the state of the art.

And the other one, six months later, a good old country hamfest, just for the fun of it.

EDITOR'S NOTE:
It was also my own personal pleasure to have been able to attend the Tasmanian Amateur Radio Convention. — One point that Tom has perhaps overlooked in his report is the excellent co-operation and liaison that exists with the Division, also the driving force behind the scenes known as the "wags" (women's activities group) who consisted of several of the wives of members in organising social events and fund raising, and very ably headed by Adeline Connor, wife of Terry VK7CT. — A tremendous show — well done Hobart. — (VK3UV). ■

QSP

BERYLLIUM AND POISONING
A QSP in AR recently drew attention to the extremely dangerous to the eyes fibreglass catalyst MEKP (methyl ethyl ketone peroxide). Another very poisonous substance, according to an article in QST July 1978 is beryllium, and almost all the beryllium compounds, when inhaled into the lungs in even incredibly small concentrations (0.01 micrograms per cubic metre). Beryllium oxide as a ceramic is used between the anode and heat sink in conduction-cooled amplifier tubes, in metal-ceramic power tubes and in Gunn and IMPATT oscillators and amplifiers to mount semi-conductor devices. The article warns that under no circumstances should beryllium oxide or articles made from it be crushed, filed, sawn, chipped, sanded, ground, put in contact with acid, swept or vacuumed. ■

IARU REGION III CONFERENCE IN BANGKOK, OCTOBER 1978

With David Wardlaw VK3ADW (Federal President) and Peter Wolfenden VK3ZPA (Executive Vice-Chairman) is, at left, Jose Tupaz, Jnr., DU1JJT of PARA.

The "top" table at the Conference from left to right: Tan Lian Huat 9V1OD (Director), Maisami Saito JH3PJE (Director), David Rankin 9V1RH/VK3QV (Secretary), Fred Lawn HS1ARD (Chairman of the Conference), Victor C. Clark W4KFC (President IARU R2), Michael J. Owen VK3KI (Director).

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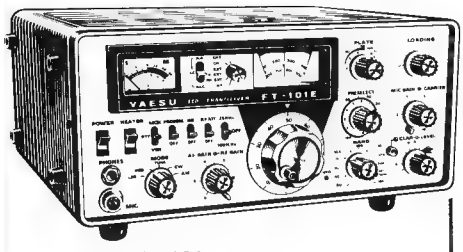

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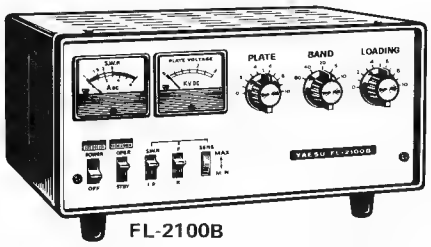

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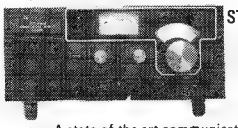

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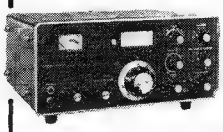

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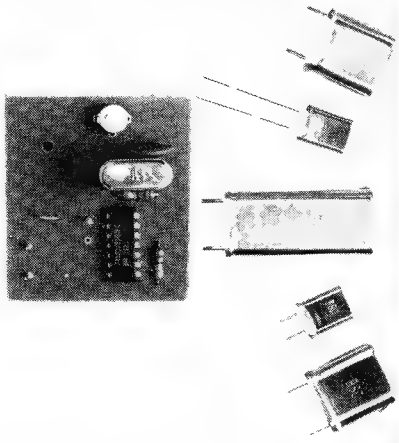

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PETER SCHULZ, VK2ZXL

KENWOOD AMATEUR RADIO EQUIPMENT

CHANNELS 0 AND 5A — THE GOOD NEWS!

QUEENSLAND CONVENTION REPORT

Don Marshall VK4AMA
23 Karowara Street, The Gap, 4061

Television on the non-international standard channel 5A is "just not on", and channel 0 stations are likely to change channels.

This was the good news for Australian amateur operators given to the WIA Queensland division convention by the Federal Liberal Member for Bowman, Mr. David Jull, as reported by Don VK4AMA.

More than 100 people heard Mr. Jull, a Parliament broadcasting committee member, open the convention at St. Lucia, Brisbane, on October 14.

More than 200 operators, friends and guests attended the convention at some time over the week-end and the good news travelled fast.

Mr. Jull said: "The decision for channel 5A to be used in metropolitan areas has been completely shelved and won't happen.

"Furthermore, an investigation is now under way by the department to eliminate those areas that are using channel 5A for translator facilities in some of the country TV areas".

Mr. Jull said he believed if it hadn't been for the pressure by Institute members, channel 5A use would have gone ahead. Australia would have been in all sorts of trouble and got into a ridiculous situation, certainly internationally.

"The power of the people is something that is often debated . . . in Parliament House. It is very easy to get yourself cut off from the outside world.

"Consequently, we found out from the Institute's members of the very real concern that you were having about the possibility of channel 5A being used.

"May I congratulate members and people who approached Members, who wrote to the Minister and who wrote to committee members.

"In fact, they formed themselves into a very satisfactory and hard hitting lobby group."

On channel 0 changes, Mr. Jull said the original idea was to transfer channel 0 stations in Melbourne and Brisbane to Channel 10.

But this would have caused problems in areas like Traralgon, Victoria, and Toowoomba, Queensland. Channel 5A was then a very real alternative.

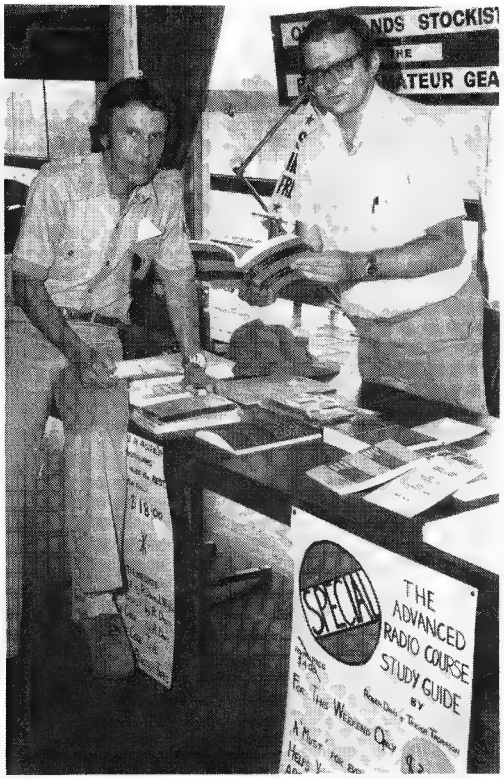
On October 11, it was announced that Channel 0, Melbourne, was going to channel 10 as soon as possible.

"I should think a similar announcement will be made in Brisbane about the fate of Universal Telecasters, "said Mr. Jull, a former Channel 0, Brisbane, employee.

"Both stations I understand are quite pleased about the change because that certainly suits their network arrangements as well."

Mr. David Jull, M.P., opening the Convention

Peter Williamson VK4ZWP (left) and Graham Carseldine VK4ZCL with their amateur TV equipment entered in the "home brew" contest.



Ian Binnie VK4ZEB (l.) and Roger Davis VK4AAR discuss Roger's radio course study guide.

Noel Mitchell (r.) and assistant at his Kenwood stand

(On October 12, the Post and Telecommunications Minister, Mr. Staley, announced the Federal Government was considering a proposal to change ATV-0's frequency to channel 10. He said before a final decision, he would invite comments from all affected stations and from the industry body.)

(Universal Telecasters manager, Mr. R. Archer, is reported to have said that ATV's proposal had no bearing on Brisbane's frequency.)

Questioned, Mr. Jull told the convention he believed quite a few adjustments could be made in Victoria. Queensland was not quite so bad, but channel 5A was just not on and that was terribly important.

He said the fact channel 0 was shifting would make him think that amateur radio operators would automatically get back to 50 MHz and up, the international 6 metre band.

He said there was worry with an initial concept that with Brisbane and Melbourne going to channel 10, the Special Broadcasting Service would take over channel 0 right round Australia.

"That's not on now either," he said.

Asked if the channel 0 change would alter the government's decision so far as WARC was concerned, Mr. Jull said he would get an answer for the Institute.

In covering several topics, Mr. Jull said he was terribly concerned with what was happening with the planning of the frequency spectrum in Australia.

A lot of stop gap decisions had been made. In many frequency areas, the country was starting to get into trouble.

There had to be much more time spent in the planning of frequencies and on their use if there was going to be some rational planning position.

CB radio was a major problem about to be faced. It was already a problem of the magnitude that many don't realise.

"I'm not here to decry CB operators en masse, but we certainly have problems with many people who call themselves CB operators."

Mr. Jull said: "We all know of the decision to go to UHF that is supposed to happen in 1982.

"There have been estimates of from 400,000 to 1.2 million sets on 27 MHz now. If they are supposed to become illegal in 1982, there is going to be tremendous pressure from that part of the community.

"It is going to be a hard decision when you consider the number of legal battles that may have to be faced.

"One would hope that when the Wireless Telegraphy Act is completely re-written, and it must be re-written, that some of those hard decisions for government will be written fairly and squarely in the Act.

"If there is a delay in that Act coming to Parliament, that could be better in the long run."

"But will a government have the strength to fulfil that ultimate decision to take those sets off 27 MHz in 1982?"

"It's something I certainly ask for your co-operation.

"I think it is a very good idea for your members as a group to continue to pressure the minister on that point to make sure that decision is ultimately made.

"CB operators have had five years notice.

"Despite that, I feel we are going to have a fight on our hands.

"Anything you can do to alleviate that would certainly be appreciated.

"I think by the experience of channel 5A, you probably realise the amount of power and punch that an organisation such as yours can have.

"Indeed, if there are any other areas of these particular operations that concern you, I would ask that you submit objections so that again a concerted approach can be made to try to get some sensible and sane decision by government."

Mr. Jull spoke on the long delays in the handling of amateur examinations.

He said the management division had suffered a number of problems since the introduction of CB radio.

A review last year recommended 105 new positions. This had been whittled down to 67.

However, negotiations were under way with the Prime Minister.

An announcement of a staff increase was expected in a few weeks.

Questioned about how the department would cope in 1982, Mr. Jull said the last job anyone in the world would want at the moment would be that of a radio inspector.

In Brisbane, there were up to 50 and 60 TVI complaints a day. If there were 10,000 RIs, a start might be made tackling the problem.

"One can only hope that something like an army of RIs will be available to clean up the place," he said.

(The statements attributed to Mr. Jull, M.P., in this article have been checked against a copy of a transcript of the Opening Address supplied by the VK4 Division. Minor differences in wording occur, however the meanings are the same —Ed.) ■

PORTABLE ARMY WIRELESS SETS OF WORLD WAR II

Compiled by R. Champness VK3UG
(Photos by Ken Reynolds VK3YCY)

7. The Teleradio 3BZ transmitter is a 8 to 12 watt AM/CW transmitter covering the frequency range 2.5 to 10 MHz using up six crystals to control its frequency. The output stage is the common 807 which is plate and screen modulated by a pair of 6V6-G valves in parallel. The unit works off 12 volts DC and draws 7.5 amps on transmit, which is about two amps more than the No. 122 set putting out the same power and including its receiver current drain too. The 3BZ could not be considered to be economical in its use of power.

The transmitter is reputed to have been used extensively by the coast watchers in WWII. The unit is extremely sturdily built and weighs 20 kilograms, and the companion 3BZ receiver weighs 19 kilograms — the weight of the accumulator is extra. The 3BZ enjoyed reasonable popularity amongst amateurs as it was easy to get at to do the various modifications they may have thought necessary. The circuitry is very ordinary and no doubt this is why it proved popular.

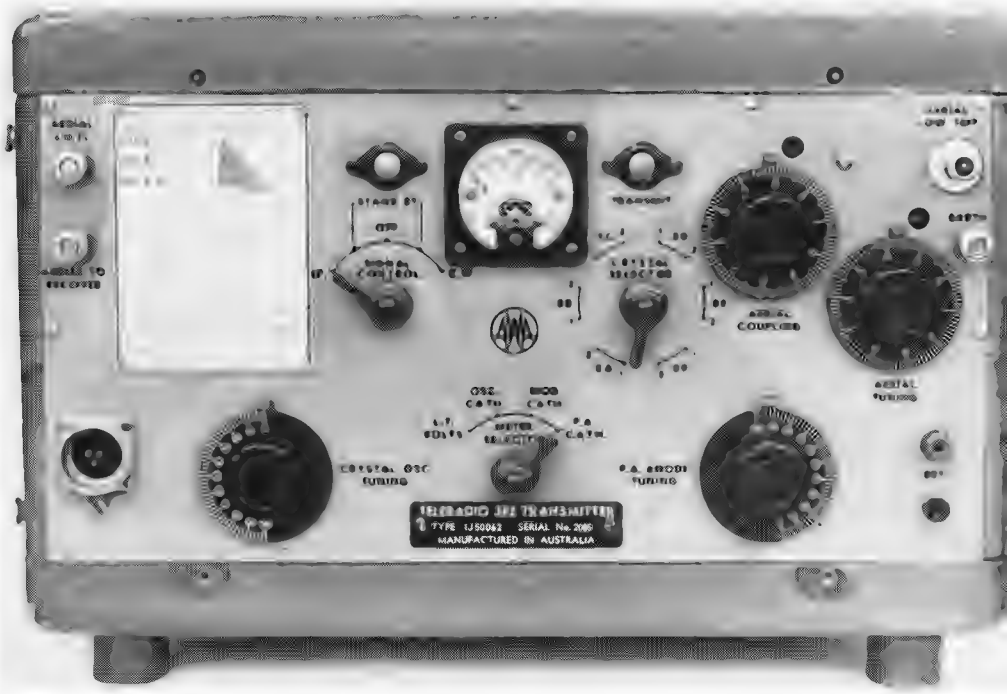


PHOTO No. 7

8. The 3BZ receiver, the companion to the 3BZ transmitter came in several different versions, the main difference being in the frequency ranges covered. The receiver in the photograph covers from 200 kHz to 30 MHz with a small gap between 520 kHz and 540 kHz, the IF frequency being 530 kHz. These sets were used in ships, coast watchers and many other areas. The set will operate on either 6 or 12 volts DC. The circuitry of the set is very ordinary having an RF stage, converter, one IF stage, a BFO and two audio stages. A vibrator supply provides the HT for the set. A separate loudspeaker goes with the receiver.

These sets proved popular as general purpose communications receivers with many people, and until recently were still being used on board some Australian ships as their main receiver — not bad for a set 30 years old. Amateurs also found the sets good and many used them but no doubt most are gathering dust now. ■

PHOTO No. 8

JOHN MOYLE MEMORIAL FIELD DAY CONTEST — RULES, 1979

Amateur operators and Short Wave Listeners are invited to make this contest, held in the memory of the late John Moyle, a huge success. Contestants may participate either as individuals or as part of a group. There are two divisions in this contest. The first is for 24 hours continuous operation, and the second for any continuous period of 6 hours. Either period must be within the 26 hours available.

CONTEST PERIOD

From 0400Z 10th February to 0600Z 11th February.

OBJECTS

The operators of portable field stations or mobile stations within the VK and P29 call areas will endeavour to contact other portable, mobile or fixed stations in VK, P29, ZL and foreign call areas on all bands.

RULES

1. In each division there are 8 sections.
(a) Portable field station, transmitting phone.
(b) Portable field station, transmitting CW.
(c) Portable field station, transmitting open.
(d) Portable field station, transmitting phone, multi-operator.
(e) Portable field station, transmitting open, multi-operator.
(f) VHF portable field, or mobile station, transmitting.
(g) "Home" transmitting stations.
(h) Receiving portable and mobile stations.

2. In each division, 24 or 6 hour, the operating period must be continuous.

3. Contestants must operate within the terms of their licence.

4. A portable field station must operate from a power supply which is independent of any permanent installation. The power source must be fully portable, i.e., batteries, motor generators, solar panels, etc.

5. No apparatus may be set up on site more than 24 hours before the contest.

6. All amateur bands may be used, but cross band operation is not permitted.

7. Cross mode is permitted, but note Rule 21.

8. All operators of a multi-operator station must be located within approximately an 800 metre diameter circle.

9. Each multi-op. transmitter should maintain a separate log for each band. A 2 FM rig may be separate from 2 AM or SSB rig, but note Rule 11. A separate QSO number series is required for each band.

10. All multi-op. logs should be submitted under one call sign.

11. Only one multi-op. transmitter may operate on a band at any one time.

12. RS or RST reports should be followed by serial numbers beginning at 001 and increasing by one for each successive contact.

13. **SCORING FOR PORTABLE FIELD STATIONS AND MOBILES.** Portable field stations and mobiles, outside entrant's call area — 15 points. Portable field stations and mobiles within entrant's call area — 10 points. Home stations outside entrant's call area — 5 points. Home stations within entrant's call area — 2 points.

14. **SCORING FOR HOME STATIONS.** Portable field stations and mobiles outside entrant's call area — 15 points. Portable field stations and mobiles within entrant's call area — 10 points.

15. Portable field stations may contact any other portable field station twice on each band and mode (10-160) during the period of the contest provided that at least 4 hours elapse after the previous contact with that station on that band and mode.

16. Stations may be worked repeatedly on 52 MHz and above providing 2 hours have elapsed since the previous contact on that band and mode. Note that FM, AM, SSB and any other voice modes are grouped together as PHONE.

17. Operation via active repeaters or translators is not acceptable for scoring.

18. All logs shall be set out under headings of date-time in GMT, band, emission, call sign, RST sent, RST received, and points claimed. List contacts in correct sequence. There must be a front sheet to show — name, address, division, section, call sign, call signs of other operators, location, points claimed, equipment used and power supply. You must also certify that you have operated in accordance with the rules and spirit of the contest.

19. Certificates will be awarded to the highest scorer of each section of the 6 hour and 24 hour divisions. The 6 hour certificates cannot be won by the 24 hour entrants. Additional certificates will be awarded for excellent performance.

20. Entrants in sections a, b, c, d, e and f must state how power for transmitting is derived.

21. All CW-CW contacts count double. Cross mode contacts count single.

22. Logs to be postmarked no later than 28 February 1979 and sent to F.C.M. Box 1065, Orange, 28000.

RECEIVING SECTION

This section is open to all short wave listeners in VK and P29 call areas. Rules are as for transmitting stations, but logs do not have to show report and serial number of the second station. Logs must show the call sign of the portable or mobile station heard, the report and serial number sent by that station, and the call sign of the station called. Scoring is as shown in Rule 14 for home stations. A station calling CQ does not count. Portable and mobile stations, which must be listed in the left hand call sign column of your log, alone count for scoring. Stations in the right hand column may be any station contacted. A certificate will be awarded to the highest scorer of each of the 6 and 24 hour divisions, individual or multi-operator entries. Certificates will be issued for excellent performance. ■

PROCEDURES — PROCEDURES

What's that?

What are we on about again?

We're on about what happens when you report Intruders!!

The first question asked by a new recruit to the Intruder Watch most usually is — "When you get our reports, what do you do with them? What happens?"

Well now! That is a moot question, and can only be answered by giving you a complete run-down on our procedures —

Firstly — Reports are received from you on our form "Observer's Log Sheet", or on form Appendix 8, according to whether the intruder has been identified or not.

At the end of each month all Appendix 8 card copies are taken in to the Frequency Management Division of the Postal and Telecommunications Branch in Marland House, Bourke Street, Melbourne for appropriate action or filing. The green, or top copy is filed by the Federal Co-ordinator, and the yellow, or centre copy by your Divisional Co-ordinator.

The Federal Co-ordinator or his assistant then transfers all reports, both Appendix 8 and the Observer Log Sheet to forms designated IARUMS/5, and forwards them to the Regional (3) Co-ordinator. After receiving the Australian, New Zealand, and any other Region 3 reports, these forms are sorted into order of frequency and forwarded to the Headquarters Co-ordinator in the United Kingdom who, along with all the Region 1 and Region 2 reports compiles a World Summary (usually consisting of 20 pages of 60 or more reports per page) which he distributes to all Societies and Administrations throughout the world (65 copies in all).

It is known that these summaries will be taken into account by the delegates at WARC 79 this year, and will be used as

evidence against those countries perpetuating intrusions. Both the Regional (3) Co-ordinator and the Assistant Federal Co-ordinator keep weekly schedules with the Co-ordinators in Region 1 and in Region 2 comparing reports and any relevant matters concerned with them.

Any reports that warrant immediate action are brought to the notice of our Administration, and during our skeds to the Region 1 Co-ordinator, who then acts upon them reporting to the British Post Office and to the Foreign Office. Very often he gets results by so doing.

Our Administration will not act upon any one individual report, but requires many more on any one intruder. Neither will they act unless their monitoring station can receive and verify the reports. Thus, it is encumbent upon us, the Amateur Observers, to supply as many reports as possible on any one intruder, and therefore, it is necessary to have many Observers to supply these reports.

Recently, it has been noticed that many more intruders are operating in our bands, especially on the 14, 21 and 28 MHz bands. Some occupy more than their fair share of any one frequency segment.

The Intruder Watch is constantly aware of this and of the devastating effect that some S9+ signals have on the Amateur Service. However, as specified above, **without the number of reports necessary** very little can be done.

Identification of the modes used by intruders can be ascertained by listening to the Region 3 identification tape which has been up-dated, and copies obtainable by forwarding a blank cassettte or reel to the undersigned.

GO TO IT! WE NEED TO BE MORE VIGILANT.

Alf Chandler VK3LC
Region 3 Intruder Watch
Co-ordinator ■

ATV NOTES

The photograph shows the British Amateur Television Club award which Winston VK7EM, recently received. Details of the award were published in AR in March 1978 but to briefly reiterate the requirements — 10,000 points must be logged at the rate of 2 points per kilometre for a successful identification of a fast scan amateur television transmission with a bonus of ten points for a confirmed two-way transmission. All Winston's contacts were with VK3 or VK5. It appears to be the first CQ TV award issued. Congratulations Winston.

Winston has written to notify readers of his intention to be active again this summer from his home QTH of Penguin. He will be looking for any VK3 or VK5 station interested in ATV DX.

The equipment at VK7EM is all home brew except for the monitors. Pictures are transmitted on 426.25 MHz with intercarrier sound on 431.75. Approximately 15 watts are fed to a broadside array with a clear view of Bass Strait towards Melbourne and districts further East.

Since his first two-way contact across Bass Strait in February 1972 he has taken part in 160 QSOs where test cards, photos and scenes around various shacks have been exchanged. The highlight of last season was the reception of pictures from Trevor VK5TH, at Mt. Gambier, a distance of 550 km. The current Australian record for two way ATV (fast scan) is held by VK7EM and Peter VK3ZPA (413 km).

During favourable propagation periods VK7EM will monitor :

1. 147.63 MHz FM Channel "V",
2. the Mt. Gambier repeater 6 VK5RMG and
3. 3.640 MHz

nightly from 1930 hours local time and will be pleased to carry out ATV experiments. Winston's phone number is (004) 37 2582. ■

WHO LISTENS TO SHORTWAVE BROADCASTING?

One of the least efficient users of the HF spectrum is International Broadcasting. This service still uses double-sideband AM emission, transmits the same programme on several frequencies in the same band, often to the same target area, and operates with seemingly unlimited power. Yet, a very basic question is seldom asked or ever asked, by broadcasters: Who is listening? Think of the people you know. How many of them use shortwave broadcasting as a source of news or entertainment? Unless you know an SWL hobbyist who collects QSL cards and who probably cares very little about the programme content of the stations he is listening to, chances are that you know very, very few people who pay attention at all to these high-powered broadcasts. In their travels to dozens of countries on all continents, the members of the International Amateur Radio Union (IARU) headquarters team have asked the question time and again, and generally have received the same answer. Even in the remote corners of the world, the regular audience for shortwave broadcasting is vanishingly small. Yet the greatest demands for more spectrum between 3 and 30 MHz are coming from the broadcasters.

Broadcasters often speak in terms of "hundreds of millions" of listeners, and use questionable statistical techniques to bolster this claim. Last year the League commissioned SRI International (formerly the Stanford Research Institute) to study the available reports on the size and composition of the shortwave broadcasting audience and prospects for future growth. The 40-page SRI report, which was included as an appdenix to the League's filing, concluded: " Reduced to a single comprehensive statement, this study clearly shows that any demands made by HF broadcasters for increased spectrum **due to increased audience demand** simply cannot be supported by the information now available."—From WARC Newsletter No. 18 of IARU. ■

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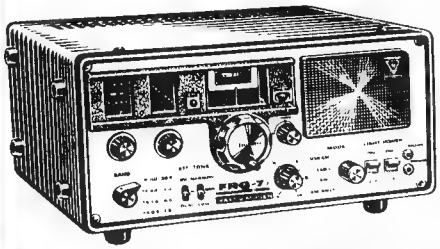

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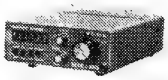

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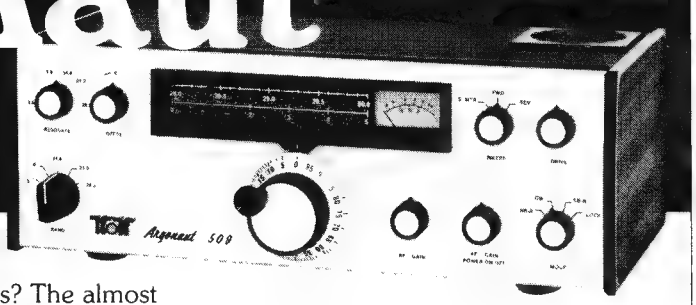

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Price increases for transceivers are everywhere in evidence due to the increased cost of the Japanese YEN, but we draw attention to the still modest increase of the KENWOOD prices. They are real bargains now compared to the YAESU MUSEN prices for equivalent types. Secret? Kenwood Australia has a different pricing policy, absorbing part of the extra import costs and not charging dealers as much profit as the other importers do. No price increases on HY-GAIN antennas though, still only $300 for a TH6-DXX, not $399! We also supply a small vial of ALMINOX with our antennas, anti-corrosion chemical for aluminium to aluminium contacts.

HY-GAIN ANTENNAS:

18-AVT/WB 10-80M vertical 23' tall	$125
TH6-DXX 10-15-20M senior 6 el. Yagi 24' boom	$300
TH3-MK3 10-15-20M senior 3 el. Yagi 14' boom	$240
TH3-JR 10-15-20M junior 3 el. Yagi 12' boom	$175
204-BA 20M 4 el. Tiger Array 26' boom	$230
HY-QUAD 10-15-20M full size Cubical Quad	$260
2M 8 el. Yagi with balun 12'6" boom	$30
2M 5 el. Yagi	$25
2M 14 el. Yagi	$40
BN-86 Balun for HY-GAIN beam buyers only	$20
BU-5 Balun suitable for 10M beams	$14

ANTENNAS SUITABLE FOR 10M:

11M 5 el. Yagi 17' boom	$70
11M G.P. with 3 radials	$20
CLR-2 11M 5/8 wave vertical w/3 radials 19'10"	$40
CLR 11M 5/8 wave vertical w/4 radials 22'9½"	$50

ACCESSORIES & COAX CONNECTORS:

SWR-50A Twin meter 3.5-150MHz 1KW SWR/Pwr meter	$26
Bumper Mount with ⅜" 24 thread antenna mount	$7
Gutter Mount with ⅜" 24 thread antenna mount	$4.50
5M length RG-58U with PL-259 one end	$3
M-ring body mount	$3
12V Regulated supply	$26
GLP Right angle RG-58U to SO-239 w/lock nut and weatherproof cap	$3.50
MLS Right angle RG-58U to PL-259	90c
PL-259 standard & solderless, RG-8U & RG-58U	75c
In-line splice RG-8U & RG-58U	75c
SO-239 chassis connector 2 & 4 hole mounting	75c
Right angles & T-connectors	$1.50
Double male & Double female connectors	80c
Mic. sockets, chassis & in-line, 3 & 4 pin	85c
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Crystals for QUARTZ-16 2M transceiver:	
Channel 51 T/R 146.55	$5 pair
Channel 64 T/R 146.20	$5 pair
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⅞" H.D. foam coax extra low loss	$1 per foot
Type RG-8U foam coax	80c per yard
Type RG-58U coax	30c per yard
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KEN KR-400 rotator with 28V AC control box	$125
CDR HAM III rotator with 28V AC control box	$175

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TS-820S 10-160M SSB/CW w/Digital readout	$1100
TL-922 10-160M Linear Amplifier	$1200
TS-700SP 2M all-mode transceiver	$800
TR-7400A 2M transceiver	$475
TR-7500 2M transceiver	$275
DG-5 Digital display for TS-520S	$200
TV-506 6M transverter	$225
TV-502 2M transverter	$275
AT-200 Antenna matchbox	$175
DS-1A DC-DC converter	$70
DK-520 adaptor for DG-5 to TS-520 use	$20
LF-30A low pass anti-TVI filter	$30
VFO-820 external VFO for TS-820S	$175
VFO-520S external VFO for TS-520S	$150
SP-820 external speaker for TS-820S	$60
SP-520 external speaker for TS-520S	$30
YG-88C CW filter for TS-820S	$55
YG-3395C CW filter for TS-520S	$50
MC-10 hand held microphone	$20
MC-50 desk microphone	$45
HC-2 Ham clock	$25
SM-220 Station monitor	$300
BS-5 (TS-520S) & BS-8 (TS-820S) pan adaptors for SM-220	$55
TS-120V 12V DC mobile transceiver with NB, VOX, IF Shift & digital readout, 30W PEP	$600

NOVICE SPECIALS: Still available at these low prices —
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FRG-7 .5-30MHz General Coverage receiver	$350
FL-2100B Linear Amplifiers	$550
FT-7 10-80M 12V DC transceiver	$525
ICOM IC-202 2M SSB portable transceiver	$175

All prices quoted are net, ex Springwood NSW, cash with order, subject to change without prior notice. All risk insurance is free; freight by air, road, rail or post at cost. All orders cleared on a 24 hours basis after receipt with payment.

Arie Bles (VK2AVA) Proprietor **Roy Lopez (VK2BRL) Manager**

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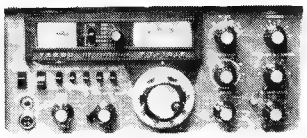

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FL-2100B. 1200 Watt Linear Amplifier. .....$549.
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YO-101. Monitorscope for FT-101E. .....$379.
YP-150. Dummy Load-Watt Meter.....$112.
YD-844. Desk Mic. .....$52.
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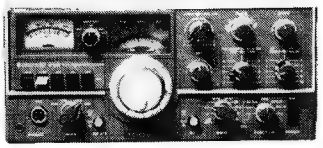

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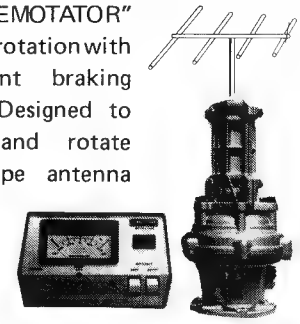

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SWR-200. Large dual meter SWR. .....$78.
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PL-259.....75 c.
PL-259 to suit 5D-FB. $1.50
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Bumper Mounts 3-8x 24 Thread. .....$10.
Wide Range of Coax Cable and Connectors in stock.
MC-440. RF Speech Processor.....$135
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6JS6C.....$12.50
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Mobile Antennas.

80M Helical.....$35.
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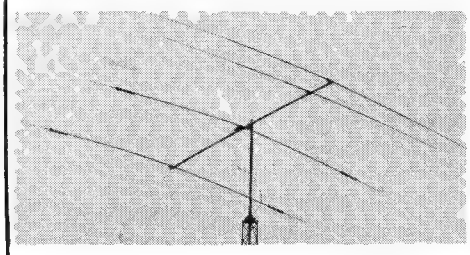
ALL Adjustable Tip Rod for easy SWR

Yaesu Mobile Set.RSL Base and Mast plus 80,15,10M Whips. Complete. .....$89.
BPM. Bumper Mount (Adjustable) to suit Helicals.

Now also available

All Australian made DUO-Band Beams -15-10 M.4 elements only $159.00



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DUO BAND BEAM $159.
80-10 M Vertical. $109.
MADE BY AMTENNA. SPECIALISTS IN HAM ANTENNAS.

SOLE AUSTRALIAN DISTRIBUTOR
CHIRNSIDE ELECTRONICS.
ALL AUSTRALIAN MADE TRAP BEAMS,
FOR AMATEUR BANDS.

MADE WITH LOCAL COMPONENTS.
SOLID CONSTRUCTION.
DUO BAND 15-10 M
BUILT IN AUSTRALIA.

Soon available ALL BAND trapped verticals.
DEALERS WANTED IN ALL STATES NOW.

Prices and specifications are subject to change without notice.

All prices include Sales Tax. Freight and Insurance extra.

AMATEUR SATELLITES

Bob Arnold VK3ZBB

RUSSIAN SATELLITES

On the morning of 28 October we were thrilled to hear the first signs of the new Russian OSCAR in its second day of operation. Its presence was first noted by Andy VK5ZWO and later by Peter VK7PF, and efforts were made to alert interested amateurs across the country. By the same evening contacts were being made by VK and ZL stations and these were repeated by more enthusiasts the following day. Excellent QSOs were achieved and the beacon on 29.4 was coming in at 5 x 9+ The telemetry code was unique, comprising seven groups of figures and letters followed by RS, which is presumably the code of the satellite; some study was carried out to interpret the data — without significant result!

Perhaps the most interesting early observation was that RS 1 was travelling in the opposite direction to the AMSAT OSCAR series, i.e. North to South for evening passes.

Later information confirmed the presence of two satellites RS 1 and RS 2, each with identical orbital parameters but with RS 2 running twenty minutes ahead of RS 1. The two can be identified by observing the telemetry data. This comprises seven or fourteen groups of letters and figures, the following being typical —

— P01U
— C18U
— F32U
— Z31U
— L83U
— B45U
— H38U

At the conclusion of this series, an RS is sent by RS 1 and RS RS by RS 2. The sequence is then repeated in updated form. It has been observed that when the groups end in U or K the transponder is OFF and when ending in W it is ON — this observation has to be confirmed.

The Russians at "Sputnik Control" have urgently requested that uplink power from an Earth station be limited to 10 watts ERP and it is hoped that all operators will adhere to this request. There is no doubt that the battery failure on OSCAR 7 has been primarily caused by excessive input power used by certain European stations. We should all co-operate to avoid this problem with our new satellites.

Elsewhere you will find predictions for RS 1 for January 1979 — I hope they will turn out to be reasonably accurate.

When both RS 1 and 2 are operating we shall have about forty minutes of continuous working each pass; starting in the North with RS 2, moving to the South and then repeating the process for RS 1. This is for an evening pass; reverse the procedure for morning passes.

Unfortunately, at the time of writing — November 8th — the transponders have been switched off but we presume this is to stabilise the satellite electronics and will only be for a couple of weeks or so. The latest available data on RS 1 and 2 is given in the attached table, some of which is from the USSR and therefore considered to be reliable.

HOW TO FIND THE RS SERIES

Passes around 4 and 5 are visible in the Eastern States each night and passes around 10 and 11 in the morning. Each pass is roughly two hours, so for pass 5 add eight hours to the time of Pass 1 from the table, then add 1 hour (for Melbourne, and a few minutes less for locations further north) to allow for the time the satellite takes to travel from its equator crossing to its acquisition time north of Australia.

Therefore, for pass 5 on 1 Jan. 1979 the acquisition time in Melbourne is 0043 + 0800 +0100 = 0943 GMT or 8.43 p.m. EAST.

The ascending node will be 250° (from the table) plus 4 x 30° minus 360, i.e. AN 10.

The path of ascending node 10 is roughly from 195° Lat. 40°N, over Rabaul PNG, over Launceston, Tas. The path of any other ascending node can be found by adding or subtracting the difference between that AN and AN 10 quoted above and drawing a line parallel to the one described above. Don't forget the calculations given are for RS 1, RS 2 will be twenty minutes earlier.

I must emphasise that no official information has been released on RS 1 and 2 and it is only through contacts with many friends that I have been able to compile this report. I particularly thank the following for their enthusiasm and assistance:— VK3ACR, VK7PF, VK5HI, VK3QI, VK5ZIM, VK4ZIL, VK3ZDE, VK2ALU, ZL3AAD, JA1 ANG.

OSCAR ACHIEVEMENT AWARD

I know that many OSCAR operators have worked many Australian States and countries within the range of OSCARS 6, 7 and 8, but only four have yet claimed the OSCAR Award. The "old timers" particularly should have received confirmation of their contacts, so why not send in your claim? All you need is confirmation from six Australian call areas together with two other countries. Send your QSLs to Col. Hurst VK5HI, 8 Arndell Road, Salisbury Park, S.A. 5109, and receive your attractive certificate. Let's show the rest of the world that we do have a few able operators in Australia. Without this support we shall be left for dead when new ventures are being planned — possibly it is already happening.

AMSAT — OSCAR 7

Battery troubles still plague AO7 and communication difficulties have been noticed from time to time. Col VK5HI reports that the battery temperature has been up to a high 58°C and this no doubt accounts for fairly continuous operation on Mode B in early November to cool things down.

Slightly varied parameters are given in the table to enable enthusiasts to calculate their own orbital data for future months.

AMSAT PHASE IIi

Revised frequencies for the Mode B transponder are given in the table.

AMSAT — OSCAR 8

Revised parameters in table.

SATELLITE PARAMETERS REVISION 3. NOVEMBER 78

		AO7	AO8	RS 1 & 2	AOIII	P76/5
Launch Date		15 Nov. 74	5 Mar. 78	26 Oct. 78	Est. Dec. 79	
Inclination Degrees		101.7010	98.99	82.5587	57	99.655
Orbit Period Minutes		114.945247	103.233	120.29461	11 hr. approx.	105.729
Orbit Increment Deg.		28.737617	25.807905	30.12		26.43
Apogee km		1461	930	1794	24249	1025.968
Perigee km		1450	910	1688	932	
				Max. inp. 10W ERP		
MODE A	UP	145.85-145.95 RC	145.85-145.95 RC	145.88-145.92		
	DN	29.40-29.50 L	29.4-29.5 L	29.36-29.40		
MODE B	UP	432.125-432.175 LC			435.110-435.290	
	DN	145.925-145.975 Inverted LC			145.810-145.990 Inverted	
MODE J	UP		145.90-146.00 LC		145.850-145.990	
	DN		435.10-435.20 Inverted L		435.150-435.290 Inverted	
BEACONS		A 29.502 L A 435.10 RC B 145.972 LC 2304.1 LC	29.402 L 435.095 L	29.4012 435.105 RS 2 is 20 min. ahead of RS 1	145.805 145.995	435.970 A0 Modulation No comm'cation

Polarisation for Southern Hemisphere:
L — Linear. LC — Left hand Circular. RC — Right hand Circular.

OPERATING

No new DX stations have been reported recently although it is probable that some new call areas will be recorded when RS 1 is operating. It should be possible to work northern JA and most of SE-Asia from the Eastern States together with the Pacific area as far as Hawaii.

Martin VK4ZIL tells me he has worked all VK call areas including the elusive VK9 and VK0 in the past few months together with several overseas countries. When you receive the QSL cards Martin, don't forget to claim the OSCAR Achievement Award.

ORBIT PREDICTIONS — JANUARY, 1979

	RS 1			OSCAR 7 (REVISED)		
Date	Orbit No.	EQX GMT	EQX °W	Orbit No.	EQX GMT	EQX °W
1	800	0043	250	18884	0123	82
2	812	0046	251	18896	0022	67
3	824	0050	252	18909	0117	80
4	836	0054	253	18921	0016	65
5	848	0057	254	18934	0110	78
6	860	0101	254	18946	0010	63
7	872	0104	255	18959	0104	77
8	884	0108	256	18971	0003	62
9	986	0111	257	18983	0057	75
10	908	0115	258	18996	0152	89
11	920	0118	259	19008	0051	74
12	932	0122	260	19021	0145	87
13	944	0125	261	19033	0045	72
14	956	0129	261	19046	0139	86
15	968	0132	262	19058	0038	71
16	980	0136	263	19071	0133	84
17	992	0140	264	19083	0032	69
18	1004	0143	265	19096	0126	83
19	1016	0147	266	19108	0026	67
20	1028	0150	267	19121	0120	81
21	1040	0154	268	19133	0019	66
22	1052	0157	269	19146	0114	80
23	1063	0001	239	19158	0013	64
24	1075	0004	240	19171	0117	78
25	1087	0007	241	19183	0006	63
26	1099	0011	242	19196	0101	76
27	1111	0015	243	19208	0000	61
28	1123	0018	244	19221	0054	75
29	1135	0022	245	19233	0148	89
30	1147	0025	245	19246	0048	73
31	1159	0029	246	19258	0142	87

REFERENCE ORBITS — FEBRUARY, 1979

	OSCAR 7			OSCAR 8		
Date	Orbit No.	EQX GMT	EQX °W	Orbit No.	EQX GMT	EQX °W
1	19271	0041	72	4636	0133	62
2	19283	0136	85	4650	0138	63
3	19296	0035	70	4663	0000	48
4	19309	0129	84	4677	0005	49
5	19321	0029	69	4691	0010	51
6	19334	0123	82	4705	0016	52
7	19346	0022	67	4719	0021	53
8	19359	0117	81	4733	0026	55
9	19371	0016	66	4747	0031	56
10	19384	0110	79	4761	0037	57
11	19396	0010	64	4775	0042	59
12	19409	0114	78	4789	0047	60
13	19421	0003	63	4803	0052	61
14	19434	0058	76	4817	0057	63
15	19446	0152	89	4831	0103	64
16	19459	0051	75	4845	0108	65
17	19471	0146	88	4859	0113	67
18	19484	0045	73	4873	0118	68
19	19496	0139	87	4887	0124	69
20	19509	0038	71	4901	0129	71
21	19521	0133	85	4915	0134	72
22	19534	0032	70	4929	0139	73
23	19546	0126	83	4942	0001	44
24	19559	0026	68	4956	0006	46
25	19571	0120	82	4970	0012	47
26	19584	0019	67	4984	0017	48
27	19597	0114	80	4998	0022	49
28	19609	0013	65	5012	0027	51

■

AWARDS COLUMN

Brian Austin, VK5CA

P.O. Box 7A, Crafers SA, 5152

THE UNIVERSITY OF CAPE TOWN FESTIVAL AND AWARD 1979

To commemorate the 150th anniversary of the University of Cape Town, Cape Town, Republic of South Africa, the Cape Town Branch of the SARL will operate a special festival station with call ZS1-UCT (ZS1 - University of Cape Town) and issue an Award.

UNIVERSITY OF CAPE TOWN FESTIVAL STATION

Call Sign:
ZS1-UCT.

Dates of transmission:
Saturday, 17th February, to Sunday, 4th March, 1979.

Time of transmission:
Saturdays and Sundays: 0600 to 2000 GMT.
Week-days: 0700 GMT to 1000GMT; 1500 GMT to 2000 GMT.

Frequencies:
Use for calling. Actual frequency will depend on QRM.

40 metres — 7.050 MHz.
20 metres — 14.210 MHz.
15 metres — 21.200 MHz.
10 metres — 28.580 MHz.
2 metres — 145.500 MHz.

Transmission modes:
SSB, CW, RTTY, FM.

QSL:
SARL Bureau, P.O. Box 3037, Cape Town 8000, Republic of South Africa.

UNIVERSITY OF CAPE TOWN AWARD 1979

1. The award is open to all licensed amateurs and short-wave listeners (SWLs).
2. DX stations and SWLs must log ZS1-UCT plus two other ZS1 stations. ZS1 contacts log between February 15 to March 15, 1979.
3. ZS and ZR stations log ZS1-UCT plus 5 other ZS1 stations.
4. All modes or combination of modes permitted.
5. All bands or combination of bands permitted.
6. Closing date for the award is July 1979.
7. No QSL cards are required. Send a copy of your log verified by two local amateurs.
8. Fee: US$1 or 10 IRCs; ZS R1.00.
9. Send applications to —
   The Award Manager ZS1MO,
   P.O. Box 5100,
   Cape Town 8000,
   Republic of South Africa.
10. A special indication is given for VHF contacts.

INITIAL ASSIGNMENT OF NEW W CALL SIGN PREFIXES

Prefix	Location
AH1, KH1 NH1, WH1	Baker, Canton, Enderbury, Howland Is.
AH2, KH2, NH2, WH2	Guam
AH3, KH3, NH3, WH3	Johnston Is.
AH4, KH4, NH4, WH4	Midway Is.
AH5K, KH5K, NH5K, WH5K	Kingman Reef
AH5, KH5, NH5, WH5	(except K suffix) Palmyra, Jarvis Is.
AH6, KH6, NH6, WH6	Hawaii
AH7, KH7, NH7, WH7	Kure Is.
AH8, KH8, NH8, WH8	American Samoa
AH9, KH9, NH9, WH9	Wake, Wilkes, Peale Is.
AL7, KL7, NL7, WL7	Alaska
KP1, NP1, WP1	Navassa Is.
KP2, NP2, WP2	Virgin Is.
KP3, NP3, WP3	Rancador Key, Quilta Sueno Bank, Serrana Bank, Serranilla Bank
KP4, NP4, WP4	Puerto Rico

SOME NEW PREFIXES ALLOCATED

The International Telecommunication Union in Geneva has allocated the prefix block J4A-J4Z to Greece, and J5A-J5Z to Guinea-Bissau, effective immediately. This does not mean that amateur call signs in these two countries will necessarily reflect this change; it does mean that the national administration may choose to assign these to amateurs if they wish.

(Editor's note: Brian is entering a hospital for a short stay in early November — we all hope you have a speedy recovery, Brian, and are up and about very soon.—VK3UV.) ■

CONTESTS

Wally Watkins VK2ZNW/NCU
Box 1065, Orange 2800

CONTEST CALENDAR

January

26-28	CQ WW 160 DX CONTEST.
27-28	THE 1979 FRENCH CONTEST CW.
27-28	MARCONI ARI PHONE CONTEST.

February

10-11	JOHN MOYLE MEMORIAL FIELD DAY.
24-25	THE 1979 FRENCH CONTEST PHONE (SAME TIMES AND RULES AS CW SECTION).

See separate column for the John Moyle Memorial Field Day rules. Times 0400Z 10th February to 0600Z 11th February. Logs to be postmarked no later than 28th February, 1979. This contest counts for the Contest Champion trophy.

CORRECTION

Page 42 AR November 1978, Ross Hull VHF/UHF Memorial Contest Rules 1978-1979, 4th para. Date of contest is 16-12-78 to 7-1-79 and NOT as quoted. —Ed. ■

AROUND THE TRADE

Dick Smith Electronics is pleased to announce that it now has available a heavy duty PVC cover available to suit the Yaesu models FT-101E, FL-2100B, FRG-7, FRG-7000, and the FT-901D.

They are ideal for keeping out dust, as well as preventing scratching of the unit when it is not in use, and should therefore help in maintaining the appearance and resale value of these items.

They are supplied free with the purchase of any major piece of Yaesu apparatus, or can be purchased separately for $3.95 each (Cat. No. D9050). ■

QSP

WHO IS WORKING DX?

One of the most prestigious awards in amateur radio is the DXCC of ARRL. Many amateurs are happy to reach 100 countries confirmed enabling them to send in a claim for our own Australian DXCC or the DXCC of ARRL. However, DXCC does not end at 100 countries because endorsement credits are given for more. Imagine not 100 countries confirmed but over 300 confirmed. That is what the DXCC Honour Roll is all about. In fact the roll in QST for September 1978 lists over 400 amateurs in the mixed Phone/CW section who have qualified for over 309 countries confirmed. The top few have qualified for 318 confirmations. Only one solitary VK appears in this list — VK4QM, only 2 ZLs and 1 ZS; 15 South Americans qualify and that is the sum total for the entire southern hemisphere — 19 in all. In the R/T section of the Honour Roll, which contains nearly 200 calls, there is no VK at all, and for the southern hemisphere 3 ZLs, 1 ZS, 1 5Z4 and 16 South Americans. Here again the lists cover 309 to 318 country confirmations. In terms of amateur populations the southern hemisphere has about 1/7th of the world's total amateurs — perhaps even only 1/8th. On these figures there ought to be about 50 in the Honour Roll, not merely 19. There are probably as many "countries" in the southern hemisphere as in the northern hemisphere, so why the discrepancy? ■

VHF-UHF
AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston. 5233

AMATEUR BAND BEACONS

Freq.	Call Sign Location
50.025	6Y5RC — Jamaica
50.050	WA1ENX — Maine
50.080	TI2NA — San Jose
50.085	WA6JRA — Los Angeles
50.087	WA6MHZ — San Diego
50.088	VE1SIX — New Brunswick
50.090	WA6JRA — Orange
50.092	W7KMA — Oregon
50.098	KG6JIH — Guam*
50.100	ZK1AA — Cook Island
50.104	KH6EQI — Pearl Harbour
50.104	FX3VHF — Lannian
50.110	HL9WI — Seoul
50.110	KG6JDX — Guam†
50.110	JD1YAA — Marcus Island
50.500	5B4CY — Cyprus
52.110	HL9WI — Seoul
52.200	VK8VF — Darwin
52.300	VK6RTV — Perth
52.350	VK6RTU — Kalgoorlie
52.400	VK7RNT — Launceston
52.440	VK4RTL — Townsville
52.450	VK2WI — Sydney.
52.500	3D2AA — Fiji
52.500	ZL2VHP — Palmerston North
52.500	JA2IGY — Nagoya
52.800	VK6RTW — Albany
53.000	VK5VF — Mt. Lofty
53.100	VK0MA — Mawson
144.101	VK2WI — Sydney
144.400	VK4RTT — Mt. Mowbullan
144.475	VK1RTA — Canberra
144.500	VK6RTW — Albany
144.700	VK3RTG — Vermont
144.800	VK5VF — Mt. Lofty
144.900	VK7RTX — Ulverstone
145.000	VK6RTV — Perth
145.100	ZL1VHF — Auckland
145.150	ZL1VHW — Waikato
145.200	ZL2VHF — Wellington
145.250	ZL2VHP — Palmerston North
145.300	ZL3VHF — Christchurch
145.400	ZL4VHF — Dunedin
432.400	VK4RBB — Brisbane
432.475	VK7RTW — Ulverstone

TV SOUND CANNELS

50.740	ZL1 — Te Aroha, near Auckland
50.750	ZL2 — Kaukapunake, Wellington
50.750	ZL4 — Hedgehope, Invercargill
50.760	ZL2 — Whakapunake, 200 miles S.E. of Wellington
51.740	VK2 — Wagga
51.750	VK4 — Brisbane
51.760	VK3 — Melbourne

* See text.
† See text.

The beacon list has been changed in format for this month and includes additional stations. The idea came when I read a very comprehensive list of beacons in the WA VHF Group Bulletin prepared by their beacon officer, Phil VK6ZKO. I cannot vouch for the total accuracy of all listings, but I am sure Phil has researched the situation and one could believe they are substantially correct, the same as that is all I can claim for my own monthly listings. I have left out VK2RHR, the Mittagong beacon on 144.120, in response to a letter from Jeff VK2BYY, Vice-President of the VK2 VHF and TV Group, indicating that the beacon has been taken out of service as the site is to be used for a repeater!

* I do query whether KG6JIH is really a beacon on 50.098, but it is in Phil's list; similarly under † I query the call sign, as I had been informed the call is KG6DX. If the bands open sufficiently in the near future we may be able to clear that one up anyway by direct listening!

There will be those who will wonder at the sense of including those beacons in exotic places, but I would think it fair to say it is quite likely all will be heard or worked from some parts of VK during the next two years. It seems almost nothing is impossible on six metres given enough time.

The TV sound frequencies are included as they can be heard from time to time throughout Australia. Additionally, there are many signals to be heard in the area between 30 and 50 MHz, emanating from mainly areas to the north, FM stations of all types, two-way radio stations, TV sound and video channels, etc. I have personally logged more than 20 signals in that portion of the spectrum with signals rising to over S9 at times. It is very interesting to follow the rise in frequency of the MUF if you have a suitable receiver. One generally starts around 28 MHz and signals can be noted perhaps as far as 38 MHz. That's about where the MUF is at that time. Perhaps later signals can be heard up to 47 MHz. On a suitable day they may later be heard on 50 MHz, with some amateur stations in Japan being audible. There are plenty of occasions in southern areas anyway when the MUF may not rise above 50 MHz and we have the frustrating position of being able to hear JAs on 50 MHz and not able to work them because of our 2 MHz frequency difference. Given right conditions, of course, the MUF will continue to rise and JAs and others can then be worked on 52 MHz. And so the MUF can go on and on and on up too! When conditions change the MUF may slowly retract or go out quickly, but will often sit around 35 to 38 MHz for long periods. So a sweep of 30 to 54 MHz every so often is a good exercise and can be rewarding. I do, however, make a point of covering that portion of the spectrum in its entirety because it is just possible that a signal may be emanating from an area other than the north, e.g. Hawaii, with no FM signals to alert you, but as a general rule, there will always be something just below 50 MHz as an indicator if you are likely to hear anything from other places anyway.

Receivers to tune 30 to 50 MHz or above are very scarce and the rather poor type of portable available from some retail sources which cover that area are next to useless if you live within the service area of capital city TV stations. There are so many sub-harmonics and birdies from those stations that it is impossible to tell what you are listening to. Their front end selectivity is so poor that such problems must be present. So what to do?

If you are fortunate enough to get on to one of those small portable Army transceivers, then buy one. They are known as the PRC 10 or PRC 10A. They were made in the USA and used by the Australian Army until fairly recent times. They are beautifully made, fully tuneable between 38 and 55 MHz with two RF stages in the receiver. They operate on FM (narrow band) and the transmitter has an output of about half a watt. They have a very reasonable bandspread, fitted with squelch, 1 MHz calibrator dial light switch, etc.

They are designed to work from dry cells, and have special valves of the 5678 series, 1.25 volts on the filaments, 67½ and 135 volts HT supply, and minus 6 volts also for the transmitter. It is not too hard to make up a suitable power supply to operate from the mains, but it is difficult to get rid of all the hum unless you are careful to have suitable filtering for the 1.25 volt filaments. The audio output is limited to a headphone but this can quite readily be disconnected and the output taken to the audio section of a cheap AM transistor radio. I made use of the —6V provided for the transmitter in the power supply to operate the audio from a disused AM receiver, with very satisfactory results. The receiver is extremely sensitive and I believe would pace it with anything you could find on the market at almost any price!

For best results you must feed in 1.5 volts to the filaments, anything less and they will not operate. The receiver needs 67½ volts at 25 mA and it needs to be at least that many volts, anything less and performance is down. I use 75 volts. The transmitter needs 135 volts at 27 mA plus —6V at 300 mA for the 5A6 valve. David VK5KK and I had no difficulty in having a 5 x 9+ QSO over 35 miles using our 6 metre beams, and also a contact using a unity gain vertical antenna. There is a coaxial antenna input socket on the transceiver, and for wideband operation I use a colour TV antenna, made by Hills, called a TL3/01. This is a log aperiodic type antenna designed for use in Channel 0 areas, but gives good results down to 38 MHz and works quite well right up to 220 MHz, and is fed by 75 ohm ET13M coax and 57 feet high, and is rotatable on the six metre tower.

So go to it. A supply of these transceivers were very smartly snapped up in VK5 once their potential was realised. I do note they are being advertised in the eastern States so have a look through your magazine. One word of warning, though. Be very careful if you go poking around inside the transceivers with voltages applied. One slip of the screwdriver or meter test lead between HT and filament and you will need to replace every valve in the receiver at least, and there are about a dozen! You will not be given a second chance I assure you!

HAWAII WORKED ON SIX METRES

Such a statement might not raise many eyebrows in northern VK but it does mean something when applied to southern States. As the rush item indicated last month, KH6EQI was finally worked in VK2 and VK5. To fill you in on the scene, perhaps we should start with this letter from Phil VK2YDY, who lives in Moree, northern NSW.

"1-10-78: 0913Z JAs 1, 2, 3, 4, 5 and 6. The 4, 5 and 6 gave me WAJA on six metres! 2-10: 1106Z JA4 and 6, open for about 6 minutes. 12-10: 1100Z KH6EQI beacon heard S4. 1120Z: Phoned Bert, beacon custodian, to get him to call me. He advised he can only use CW on beacon frequency and he would listen on 52.104 MHz. 1130Z: beacon faded out. Rang Bert next day and he said he heard me for a few seconds. 15-10: 0645Z KH6EQI in again, S1. 0650Z: beacon faded out and JAs heard. Worked a couple of JA3s. 0755Z: JAs faded out and KH6EQI appears again. Rang Bert. 0759Z: CW from Bert S1-2. Bert heard nothing from me. 16-10: 0850Z KH6EQI barely audible. 0900Z: Signal strength to S1. Rang Bert again, to try again. Third time lucky? 0924Z: Signal reports exchanged, received R4S4. Sent R5 SO. (Gain of my receiver doesn't look good at 50 MHz.) Cross mode CW/SSB split frequency. 0945Z: Kerry VK2BXT worked KH6EQI. Signals peaking S9. 1030Z: Still copying KH6EQI calling CQ, VK, faded out shortly after. 17-10: 0330Z: Rang Bert again to discuss last night's happenings. He was very pleased to work you (VK5LP) and David (VK5KK). He didn't expect to work anyone else. He also said after his QSO with me he heard KH6IAA on backscatter calling me on 52.104 MHz. KH6IAA is about 18 miles south-east of Bert, but I did not hear him.

"I will get in touch with KH6GRQ and Don KH6DX and see if they can work SSB on 52 MHz. The KH6EQI beacon runs 80 watts output to a 6 element yagi on a 110 foot mast in Pearl Harbour dockyards. Bert receives with a 6 or 8 element quagi at his QTH. The beacon is remotely controlled from Bert's QTH and is also programmed to point to VK from 0700 to 1600Z."

Thanks for the information, Phil, and congratulations to both you and Kerry. To say that David VK5KK and I were pleased to work Bert also would be an understatement! David worked Bert first, with signals peaking to S9. David worked him both as KH6EQI and also under his own call sign of KH6HI. I worked him as KH6EQI at 1016Z, sending 559 and receiving 569. Mark VK5AVQ tried hard to latch on to Bert but was unsuccessful. Several others tried, too, with no results. KH6EQI was audible in VK5 for almost two hours from around 0945 to 1140Z with the strongest signals about 1000Z. So it's been done from VK5 once again but after a wait of some 18 years or so. It is believed Al VK5EK (ex VK5ZCR) worked Hawaii on six metres around 1960-61, and there is no supportable evidence it was done by anyone here during the last cycle.

Thus my statement of more than 12 months ago that I felt it necessary to include beacons from far away places because one day they would be heard has been vindicated. I firmly believe that our contacts will not be the only ones to such areas before the present high peak is gone, but you must be prepared to monitor the six metre band constantly when conditions are right, and that also includes knowing where the MUF is. Who said beacons are useless and outmoded? Maybe you don't need beacons if you are looking at an area of intense amateur activity, viz., Japan. But I am

certain the KH6EQI contacts would never have been made without the help of the beacon alerting those keen enough to listen and be on the bands. No grumbles, please, from those who missed out, it may be your turn next time, but it won't be if you are not able to or prepared to spend some time monitoring. The KH6EQI contacts just don't happen as a general rule, it means someone somewhere has done some homework In this case it was Phil VK2YDY and David and I were fortunate enough to share in the final results. After KH6EQI had faded out, a number of JAs were worked in VK5 with signals to S9, which shows a pattern similar to that at Phil's QTH, in that the JAs and KH6 are not available at the same time.

Neville VK2ZLL writes from Hargreaves, 40 miles north of Orange, to say he has been sharing in the six metre DX, particularly to Japan. First contacts started on 18-9. On 14-10 he worked VK4XZ in Townsville, and further JA contacts on 15-10 and 16-10, with the latter the best to date (same day as KH6EQI contacts). Further contacts to JA on 18, 19, 20 and 22-10.

Neville mentions he operates from a TV Channel 1 area, but fortunately the station is vertically polarized which helps a lot. He uses an IC502 barefoot to a 5 el. yagi 10m high, but is currently making some improvements, including a better dial drive, 3N210 pre-amp, 25 watt linear (for out of TV hours!), but as this is his first 6 metre season he needs time to get going properly, but is very pleased so far. Thanks for writing, Neville, and good luck.

FROM DARWIN

Graham VK8GB sends along a lot of information again. From it one notes two metres has been open regularly to Japan, but no new call areas except JA3WEG on 25-9 at 1110.Z. The other JA3 he worked previously was portable in JA4. Graham goes on to say:

"I worked Torres CR9AJ one evening for country No. 13 on six metres. He is looking for VKs on 52.050, but he hasn't been heard since 24-9. Gerry KG6JIH reported hearing an unidentified WB7 on CW on 50.106 at 0516Z on 14-10. Solar flux was 181 that day so maybe it was a marginal F2 opening. He was hearing KH6EQI at the time.

"The evening openings have been getting a long way south. Last night, 15-10, JAs worked VK1, 2, 3, 4, 5, 6 and 8, P29 and KG6. I haven't heard any JAs working you yet!! (Yes they have, I've been around! . . . 5LP.)

"FO8DR has been fairly active. He has worked JA, KH6 and W6 recently and has been heard by HL9WI. The KH6 stations have been working into W and PY recently. KH6EQI was heard in Darwin every day (7 to 14-10) last week but no contacts. The guys over there don't seem to be too active at present. VK9ZR has worked widely into JA and KG6 in the evenings. VK9ZM has worked a lot of JAs but has been very quiet lately. The backscatter opening to VK4 on 9-10 was interesting. Signals were reflecting from an area over the Solomon Islands. Barry VK4ZBJ gave Brian VK8VV an S9 report!"

Graham sent me a copy of his log for the period 20-9 to 15-10 and again it is interesting to note the large number of two metre contacts to Japan. It appears Graham starts off woring stations on 28 MHz up to about 1000Z, then switches to 52 MHz, around 1100 changes to 144 MHz for an hour or so, then when these signals fade out, 52 MHz can be resumed again up to 1400Z or later, then back to 28 MHz. What is going to be interesting in the next year or two is whether this pattern is going to be maintained in Darwin with an increase in such activity in southern regions, or whether we will see a continuation of the rather spasmodic contacts we now get. Certainly here in VK5 there are many small openings, almost on a daily basis at present, to Japan, with one or two stations being worked, mainly on CW during the day, with stronger openings later.

So, in Darwin the following has emerged. 20-9: 52 MHz, 5 JA contacts 1325 to 1348Z. 21-9: 144 MHz, 7 contacts 1143 to 1223. 52 MHz, 6 contacts, including 3 to KG6, 1230 to 1318Z. 22-9: 1148 to 1152Z, 144 MHz, 2 contacts: 1158 to 1259Z 8 to JA, plus HL9WI. 23-9: 1058 to 1129, 52 MHz, 5 contacts. 1137 to 1202, 144 MHz, 2 contacts. 1217 to 1250, 52 MHz, 3 to KG6, one JA. 24-9: 1057 to 1144Z, 144 MHz, 14 contacts to S9. 1155 to 1400Z, 52 MHz, 7 to JA, 3 to KG6, and CR9AJ, a new country, at 1305Z at 5 x 9. 25-9: 1052 to 1158Z, 144 MHz, 24 contacts. 1205 to 1320 three contacts KG6 and JA. 28-9: 1048 to 1147Z, 52 MHz, 7 to JA. 29-9: 1130 to 1149 one JA, 2 KG6. 1245 to 1305, 52 MHz, 2 to JA, 1 to KG6. 1-10: 1050 to 1325, 52 MHz, 6 contacts. 1135 to 1332Z 9 to JA. 4-10: 1002 to 1029Z, 52 MHz, 5 to JA. 5-10: 1100 to 1132Z, 52 MHz, 4 to JA, 1 to KG6. 1202 to 1213Z, 144 MHz, 3 contacts. 1220 to 1258Z, 52 MHz, 7 to JA. 6-10: 1155 to 1347Z, 52 MHz, 6 to JA, plus HL9TG. 7-10: 1134Z, 52 MHz, JA2BZY. 1153 to 1157Z, 144 MHz, 2 contacts. 1304 to 1413Z, 52 MHz, 10 to JA, 1 KG6, HL9WI. 8-10: 1100 to 1120Z, 52 MHz, 3 to JA. 1142Z, 144.110, JH6TEW. 1208 to 1309Z, 52 MHz, 7 to JA, HL9WI and KG6DX. 9-10: 1220 to 1322Z, 52 MHz, 5 JA, KG6JIH and VK4ZBJ (backscatter). 11-10: 1045 to 1212Z, 52 Mhz, 3 to JA and KG6. 12-10: 1140 to 1210Z, 144 MHz, 4 contacts to JA. 1223 to 1231 Z, 52 MHz, 3 to JA. 1241Z, 144.154, JH6DVD. 1326 tto 1350Z, 52 MHz, 4 to JA. 13-10: 1035Z, 52.046, JH2VHL. 1144to 1157Z, 144 MHz, JA6SZC and JR6HRE. 1215 to 1230Z, 52 MHz, 5 to JA. 14-10: 1115 to 144Z, 52 MHz, 3 to JA. 1150 to 1203Z, 144 MHz, 3 to JA. 1245 to 1407Z, 7 to JA, KG6JIH. 15-10: 1110 to 1241Z, 144.110, 11 to JA. 1225 to 1325Z, 52.033, KG6JIH, 2 JA.

For those of you who have been following the trend of events by reading the detail of these contacts will note that 144 MHz does not come any earlier than 1100Z except for those days of a large number of contacts when they may start soon after 1030Z. The band appears to remain open at that frequency for 1 to 1½ hours with a variety of signal strengths — but this may be due in part to station efficiency at the JA end rather than band conditions. The contacts continue to appear on a very narrow north-south path with no deviations so far. It would be interesting to know how much further than Darwin the signals are travelling south. If there were 2 metre operators at Wave Hill Station, some 300 miles due south of Darwin, we might get some idea where signals are finishing up, and how they relate to the Darwin contacts.

VHF ADVISORY COMMITTEE

It was very encouraging to listen to the WIA broadcast of 5-11 and hear Peter Wolfenden VK3ZPA, Chairman of the VHF/UHF Advisory Committee, say it now appears unlikely there will be any proliferation of the use of Channel 5A, particularly in the capital city areas. No doubt due in no small way to the depositions submitted by the WIA and the general lobbying by amateurs in their own way has brought enough pressure to bear for the matter to be reviewed at the appropriate level. I have always conceded in these notes that there are enough people with the necessary skills in the P. and T. to enable sensible decisions to be made if the necessary facts are presented. We hope this has been the case this time, and if the present statements means the end of Channel 5A eventually throughout the country it will be a great step forward. Our thanks to all concerned, including the P. and T. from Ministerial level downwards.

We can now only hope something can be done about Channel 0. Whilst it appears some thought is being given to the changing of Melbourne and Brisbane away from Channel 0 one does wonder what went wrong with P. and T. thinking to allow the setting up and operation of a Channel 0 translator in the Cairns area of North Queensland — right in the heart of sporadic E propagation. I have already had reports of a similar station in Vladivostok causing interference during September. It's just too hard to credit the thinking which precedes such a decision, surely it can only be noted as an official blunder. I know the translator operates with 500 watts and a directional antenna pointing inland, but the low power will allow interference to be received all the more readily. Whatever next are we going to hear about!

GENERAL NEWS

I recently advised Aub VK6XY in Albany by telephone that the Adelaide beacons were now back on the air after an overhaul, during which a new specially cut crystal was installed in the 2 metre beacon in an effort to improve its stability. Aub in return mentioned their six metre beacon was undergoing a frequency change to 52.800 MHz as from early December due to a mixing problem caused by one of the local TV stations appearing as a spot on the old beacon frequency. The beacon list has been amended accordingly.

In talking with David VK5KK he mentioned that to 6-11 he had worked 89 JAs for the month, but considered it a slack month as the previous period from 17-9 he had worked 102! So that makes a total of 191 from 17-9 to 6-11, of which he worked 50 on 18-9! Total for 1978 to 6-11 stands at 374 contacts with stations in Japan.

These figures give some idea of the consistency of contacts being made with Japan, some are only CW strength but are worked, and can appear as early as 0300Z or as late as 1440Z, depending on the mode of propagation. Many of the contacts appear to be made at a relatively low angle of reception as anyone shielded by hills like myself or some in Adelaide find the signals much weaker and at times unworkable. David consistently receives such signals 4 or 5 S points stronger due to his open location at Wasleys, 55 miles north of Adelaide. He is now aided further with the installation of two stacked 8 element yagis for six metres which lower the vertical angle considerably.

It appears the Japanese effectively know about our 2 MHz difference from their main operating area of 50 MHz, and there seems little doubt the large amount of publicity we have tried to make available overseas regarding the difference has been noticeable in getting stations to look for us, but we must still miss many contacts because lesser known areas like Hong Kong, Korea, Philippines, various island groups, etc., are never heard on 52 MHz, always and 50 MHz, where they are in demand by areas which can work 50 MHz, so of course they can work all they want to without having to worry about us. So it seems we are going to miss out on useful and unusual contacts through not operating on 50 MHz and unless P. and T. unbends a little that situation is going to continue or some will take the chance and operate on 50 MHz anyway, something which is not desirable. Many CBers operate on illegal channels with immunity because they are not known; we may find it difficult to do the same if we wanted to because of the needs to give call signs to confirm contacts.

Thought for the month: "Married life teaches one invaluable lesson: to think of things far enough ahead not to say them." That's all for now. Many thanks to David VK5KK for providing the excellent notes last month.

73. The Voice In the Hills. ■

INTERNATIONAL NEWS

Reciprocity. When making application for a reciprocal licence in the UK the Home Office have required a UK address. According to Radio Communcation September 1978 this is no longer a requirement for touring visitors requiring a licence for 28 days or less.

TONGA

Printed in the September 1978 issue of Break-In is a letter to NZART from the Supt., Dept. of Tel. and Tel., Nukualofa, Tonga, advising that all A35 amateur radio licences expire 30th June each year and can only be renewed on personal application at a T. and T. office. ■

QSP

PIRATES

It appears from the DX notes in Radio Communication October 1978 that pirate activities on the amateur bands using amateur call signs is not confined to Australia. One example quoted was deliberate interference by a known pirate call sign (that of G3RCA) on several DX dog-piles by calling CQDX on the frequency.

70 cm INTERFERENCE

According to Ham Radio August 1978 amateur users of the 70 cm band may be in for severe interference problems when the US Air Force "PAVE PAWS" radar goes into operation in the next year or so. This is a very long range system which has an average ERP of about 1000 megawatts; the main beam could burn up a receiver front end 15 km away. ■

KENWOOD

pacesetter in amateur radio

TWO NEW MODELS FOR 1979

HF

The *KENWOOD TS-120V* HF Mobile Transceiver, packed with all the features for the Novice and Unrestricted Amateur — Check these features.

★ Full band coverage 80m to 10m includes all crystals)
★ 30 Watts P.E.P.
★ SSB-CW
★ W.W.V.
★ Digital Readout
★ 25 kHz calibrator
★ Noise Blanker
★ 13.8V DC @ 4 Amp
★ Rx sensitivity better than .25UV S+N/N 10 dB
★ Size 241 mm wide x 94 mm high x 235 mm deep.

Plus full range of accessories — VFO — Filters, etc.

VHF

KENWOOD TR-7600 VHF Mobile Transceiver.
10 Watts O/P
800 CH capacity
144-148 MHz.

Features a Full 4 MHz coverage in 5 kHz steps

★ Power 10W or 1 Watt
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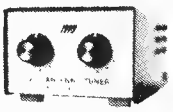

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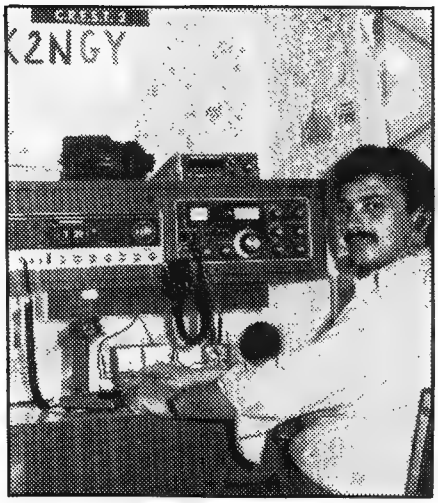

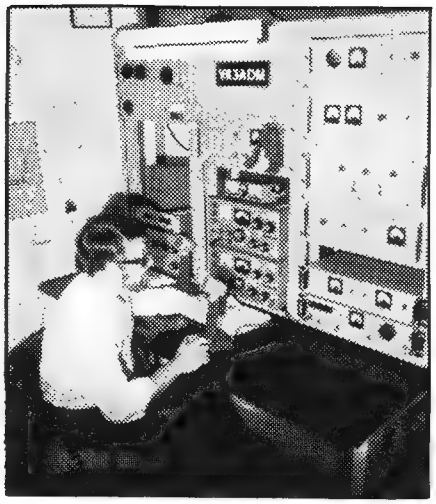

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LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publisher.

Dick Ashton VK5DQ
P.O. Box 11, Woomera, SA 5720
28th October 1978

The Editor,
Dear Sir,

I thought that you might be able to use the enclosed "press" we got from the Woomera newspaper (The "Gibber Gabber") in Amateur Radio. We don't often get mention in AR, so how about putting it in? — **(Yes, most happy to — is published elsewhere in this issue — Ed.)**

We are involved in regular (not quite weekly) Sunday morning QSOs with other SA Scout stations since the virtual demise of the 80 metre weekday night SA Scout net. Our skeds are with VK5BPN and VK5BPT on 7070 +/— QRM most Sunday mornings at about 10.30 SA time, after the VK5 40 metre call-back has concluded. A number of Jamboree-on-the-Air stations in the Eastern States and Tasmania have expressed interest. ■

The Editor,
Dear Sir,

Your reply to Ron Goodwin VK2BKN, page 45, AR October 1978, is, I think, incorrect. That is if you wish to convert GMT to "VK2" time.

GMT **never** changes, but LMT at Greenwich does sometimes, however local time for VK2 land is GMT plus 10 and, come daylight saving time (or local daylight saving time) will be GMT plus 11, **not** 9 hours as suggested.

Yours faithfully,
G. Lanyon VK2AGL.

(Yes, so I found out, see p. 22 November AR 1978.—Ed.) ■

Newspress Pty. Ltd.
250 Spencer Street, Melb. 3000.
October 16, 1978.

The Editor,
Dear Sir,

A letter appeared in issue 6 of Amateur Radio Action (not AR) which complained of the intrusion of full-grade operators into frequencies allocated for Novice usage.

This letter was attributed to Mr. Rob Stewart (VK3NOW), and I wish to make it clear that this letter did not, in fact, originate from this operator.

Mr. Stewart not only does not share the opinions expressed in the letter, quite to the contrary — he is very happy to hear full-call stations operating on these frequencies as on several occasions he has made worthwhile contacts as a direct result of assistance from a full-call station.

I wish to sincerely apologise for any embarrassment caused to Mr. Stewart as a direct result of this letter and, in consequence of this situation, the following now applies to any letters intended for publication in Amateur Radio Action.

No letter will be considered unless it contains a private phone number or other means which can be used to check the authenticity of the letter and verification of the author.

Again, my sincere apologies to Mr. Stewart, who, we again stress, was in no way associated with the letter in question; also, my thanks for his understanding of the regrettable occurrence.

Yours faithfully,
Len Shaw, Managing Editor. ■

11.10.78

The Editor,
Dear Sir,

As a VK3 divisional councillor, and a person who had not been involved with many on-air contests in the past, I felt that it was my obligation to enter and to operate in the last Remembrance Day contest.

Prior to the contest, my wife, who consented to stay up through the contest and keep log for me and myself put in several hours of work making the equipment set up satisfactory for the contest and making the house suitably visitor and distraction proof for the duration. All in all, we were both quite enthusiastic about the coming ordeal.

At the starting time and after the address, the bands became alive with signals and I was wondering how long we could keep the pace. However, as time moved on, the contact rate generally slowed down with occasional bursts of rapid activity and continually scanning the bands coupled with gallons (many litres) of the Xyl's coffee kept us going.

It was not until the early daylight hours of Sunday morning that I started to regret that I had entered the contest as time after time we were subjected to very poor operating tactics by other stations, i.e. piracy of the frequency I was operating on to catch my last contact and to keep the new frequency as fresh unbroken ground from which to score a few more elusive points.

As our tolerance started to wane, I became more critical of not only the very poor operating ethics of some amateurs but also of their signals. Some sideband signals were so wide in frequency and distorted that in comparison one could be forgiven for thinking that AM was the new mode that conserves frequency space. I presume that these competent operators were inclined to think that if they made their signals wide enough and loud enough they would not only suffer from adjacent QRM due to effective blocking of adjacent frequencies but be regarded as an easy contact to be had by others with a callous disregard to the spirit of the contest.

By 2 p.m. EST, both my wife and myself were on the point of complete disgust with some operators and so after some 400 point scoring contacts, I turned the equipment off and vowed to never again enter any on-air contest that did not discriminate against the poor operator, or one that allows the idiot, the unthinking and ratbags to certify that they have operated in the spirit of the contest . . . Let us all look at our operating habits and if found wanting in some areas, don't shrug it off as a joke, do something about fixing the problem. After all, amateurs are not the only ones who listen on our frequencies. Remember the slogan "use them or lose them"?? How about, use them, but don't abuse them or lose them . . .

Perhaps next year, depending on rule conditions we will again try the RD . . .

Ian Foster VK3BLF,
Watts Road, Nicholson 3882. ■

10 Farrow Street,
McDowell 4053.

The Editor,
Dear Sir,

"2 METRE FM CHANNEL CHANGE"

Amateurs have witnessed the exceptional growth of FM activities within the 2m band and, by discussion, most have been conditioned for the inevitable revision of the FM and Repeater channel system incorporating a closer spacing. What is happening to the band 144 MHz to 148 MHz is merely a repetition of the problems experienced with the commercial FM two-way radio bands which resulted in a 15 kHz spacing. This final spacing was achieved in several steps but was hindered by the technology of those days. We are more fortunate, as the technology is now here to allow us a channel spacing of 15 kHz and possibly less with minimum co-channel interference. So when planning a band change why settle for half measures? Why not establish a system that will, or is working now and allows ample expansion with nil or insignificant alteration?

Even amateurs are reluctant to change an accepted system, and to suggest an idea that has some anomalies is to provide criticism which need not be.

By analysing the suggested system as kindly listed in the October edition, it is apparent that if a 25 kHz spacing only is considered, then the channel numbering appears to be systematic.

Example 1.

CH 602 = 146.025
605 = 146.050
607 = 146.075

However if the numbering is to exhibit a relationship to the actual frequencies (as would be displayed on some synthesized sets) then discrepancies would be most apparent.

Example 2.

CH 602 = 146.025
603 = 146.035
605 = 146.055 **

or Example 3.

CH 602 = 146.020 **
603 = 146.030
605 = 146.050

The last two conceptions illustrate the inadequacies involved.

If the first system (1) is the intended interpretation then may one be excused for inquiring as to the whereabouts of channel 603, 604, etc.

Credit should be given to the committee that instigated our existing 80 channel concept as it is easily expanded to an 800 channel version of 5 kHz spacing without affecting the present 80 channels.

e.g. 146.000 = CH 40 maybe CH 400
146.025 = nil maybe CH 405
146.550 = CH 51 maybe CH 510

System of Calculation:—Example CH 506.

1st Digit = 5 x 500 kHz = 2.500 MHz
2nd Digit = 0 x 50 kHz = 0.000
3rd Digit = 6 x 5 kHz = 0.030

144.000
CH 506 — 146.530 MHz

This concept should prove widely acceptable due to its relationship with the present system and yet be more versatile than other suggestions because of its 5 kHz channel spacing. It also lends itself to synthesiser control with three thumbwheel switches.

Remember, time is here for criticism but your approval or disapproval will be wasted if it is not aired prior to the committee meeting which may select a concept that is not ideal.

Gary Ryan VK4AR. ■

98 Natimuk Road,
Horsham 3400.
November 8, 1978.

The Editor,
Dear Sir,

Further to a letter from David Robertson VK5RN in your November columns about lack of success in relation to Channel 5A, may I have space in Amateur Radio to tell of my experience?

Along with a number of others, I wrote to the Minister for Posts and Telecommunications about the Channel 5A problem. Part of his reply is reproduced below:

"Channel 5A is currently allocated to four television stations and seven translators throughout Australia. In each of these cases, interference to amateur radio operations has been able to be resolved. The Minister recognises, however, that the use of the channel in this manner does not accord with international practice. Its more extensive use in recent years has been due to the increasing demand for television services and the allocation of certain VHF frequencies for FM broadcasting.

The 1979 World Administration Radio Conference will consider the future use of the VHF band. It is likely that the Australian brief for the conference will recognise that the use of channel 5A for television should be phased out as soon as practicable."

I believe this goes even further than the Departmental Media Release reproduced in WIANEWS in November Amateur Radio headed "Go Ahead for Ethnic Television".

Yours faithfully,
S. G. Phillips VK3JY. ■

SUPPORT OUR ADVERTISERS

WICEN

Ron Henderson VK1RH
Federal WICEN Co-ordinator,
53 Hannaford St., Page ACT 2614
Ph. (062) 54 2059, A.H.

This issue I wish to provide some guidance for regional and club WICEN officers on training programmes.

A WICEN course must be short to retain maximum interest and participation, initially four evenings or one full day are suggested as a suitable duration.

A suggested WICEN course block syllabus is as follows:

Aims of WICEN, register of members and equipmen: 1 period of 40 mins.
Emergency service voice procedure: 1 period.
Message writing: 2 period.
Formal message handling on air: 2 periods.
SIGCEN procedures, formalities P. and T. regs. insurance: 1 period.

VHF local coverage forum: 1 period.
Call out procedure and WICEN administration: 1 period.

May reading: 1 period.
SES — local organisation and liaison: 1 period.
This should be followed by a half day field radio exercise to consolidate the classroom work.

Voice procedure is based on SES practice, i.e., the grey "Civil Defence Communications, Part III, 1969" booklet.

The scope is deliberately wide, including as it does message writing and map reading, for example, to ensure that the WICEN operator has a good knowledge base to complement his local SES official in any emergency situation.

Course organisers can obtain more details, including instructors' lesson plans, by writing to the Federal Co-ordinator, or contacting their Divisional Co-ordinators.

WAGGA WICEN

So far this season there has only been one moderate flood on the Murrumbidgee, and WICEN was used to provide communications for the Wagga Rescue Club as part of the excellent standing arrangements that exist between the two organisations. During the past six months, members of the Wagga Rescue Club obtained adn completely reconditioned a 75 foot heavy-duty radio tower for the purpose of erecting WICEN's VHF and HF aerial systems. This tower, when combined with a most excellent operating console and telephone, would serve as an indication of the top liaison that exists between this VRA Club and Wagga WICEN. It is also pleasing to report that an association of a similar manner exists between WICEN and the Regional Headquarters of the State Emergency Services, with whom Wagga WICEN is greatly involved during times of major river flooding.

Recently, a large WICEN exercise was conducted in conjunction with a Handicapped Persons Radio Appeal Day via the local broadcast station. WICEN's role was to accurately handle over 1000 messages during a twelve hour period. A base was set up at the broadcast station centre and information was continuously passed to six WICEN mobiles strategically positioned throughout the city. The efforts of many WICEN members helped in making the worthwhile event most successful and at the same time provided members with the opportunity to handle high density messages, quite often under pressure.

WICEN INVOLVEMENT IN NDO EXERCISE

On Thursday, 2nd, and Friday, 3rd November, 1978, Australian amateurs took part in the annual Natural Disasters Organisation (NDO) exercise.

Exercise COMCOORD involved a simulation of cyclone damage at Cairns, floods in Northern NSW and major bushfires in the Blue Mountains to exercise the staff of the Natural Emergency Operations Centre (NEOC). WICEN groups were involved in providing communication links to the affected areas from NDO headquarters in Canberra.

The ACT WICEN group provided and manned a series of stations to give total coverage of the 28 hours of the exercise. During this time a large amount of message traffic was exchanged with WICEN groups in Cairns, Lismore and Orange. Also the SA and WA groups were on listening watch and exercise traffic was passed to WA during the night period. A link into NEOC was maintained using a NDO high band VHF portable set.

At the initial debriefing, immediately after the exercise, the NDO Exercise Director expressed his thanks to WICEN for a job well done and invited the Federal Co-ordinator to make proposals for WICEN involvement next year. Thanks are due to all amateurs who took part and demonstrated our capabilities. ■

DIVISIONAL NOTES

ACT

The Mt. Ginini repeater stolen earlier this year was recovered in Melbourne.

NSW

All the "N" suffixes have been used up and new suffixes in the VAA-VZZ series are being issued as well as "N" suffixes vacated when Novices upgrade. Even the AA to BZZ call sign series have almost been completely used. 1979 VKZ subscription rates will be the same as for 1978.

NEWS FROM WAGGA ARC
AOCP AND NAOCP TRAINING

The Novice Course for 78 is now completed, and the candidates are now waiting for the 21st November examination. It is envisaged all of those that have completed the 1978 NAOCP course are intending to enrol for next years full AOCP. For those who are not currently undertaking training with the Wagga Amateur Radio Club, and who wish to join the Club's 1979 Training Scheme (either NAOCP or AOCP) you are invited to write to the Secretary, c/o P.O. Box 71, Kooringal, Wagga 2650 for full details.

VHF REPEATER

The Wagga Club VHF Repeater (Ch. 3) is still fully operational and provides around 50 km mobile coverage in most directions. The power output has recently been raised to 30 watts into the coax. which feeds a 4.5 dB aerial system. The receiver is operating via a temporary antenna until the system duplexer is satisfactorily completed and tested.

VICTORIA

In a recent appeal the Victorian Town Planning Appeals Tribunal decided that a planning permit for an amateurs' tower was not required even though erected on residential zoned land. Only a building permit is now necessary. 1979 VK3 subscription rates will be $23.00 for F and C, $20.00 for A and T, $12.00 for students and pensioners.

QUEENSLAND

The Sunshine Coast ARC has been re-formed under the Presidency of VK4CY. VK4 subscription rates for 1979 will be the same as for 1978.

SOUTH AUSTRALIA

A new amateur radio club was recently formed in Port Lincoln. At the inaugural meeting on 5th September Jack Martin VK5EJ was elected President. Jack was a valued member of the Federal Executive some years ago before he moved house.

Michael Owen VK3KI visited Adelaide in September at the invitation of the Divisional Council to give an expert opinion relating to the refusal of a Local Authority (upheld by the Planning Appeals Board) to grant an application from a WIA member to erect a tower. Michael briefed Divisional Council on WARC 79 matters during his visit.

A one-day Divisional Planning Conference to be held in December will assist the Council to determine the right direction for future progress.

VK5 subscription rates for 1979 will be $23.00 for F members, $21.50 for ACT members and $11.50 for students and pensioners ($4.50 for family membership).

TASMANIA

Bruce Bathols VK3UV attended the Hobart Convention early in November as a representative from the Executive. 1979 subscription rates will be $20.00 for all grades FACT and zones. ■

MAGAZINE INDEX

Syd Clark, VK3ASC

BREAK IN August 1978
Otago Branch 70 cm FM Transceiver; SL600 Series Transceivers; Great Circle Bearings.

CQ July 1978
Collectoholics; The General Radio 821 RF Admittance Bridge; The Ten-Tec Argonaut (Review); Pre-Launch Testing of AMSAT/OSCAR 8; Economical Diode-Switched Crystal Filters; An RTTY Primer, Pt. 5 — Getting on the Air; Trouble Shooting Techniques for Solid State Cricuitry; Home-Brewing, Soviet Style; A New Prediction for Cycle 21; Incorporation of the Vacuum Relay QSK into a Commercially Equipped Station, Pt. 2 — The Heathkit SB400/401; An Unabashed Look at Personal Computing; It's a Snap; Antennas: Quads and More Quads.

QST July 1978
A Digital Speech Readout for the Electronic Keyer; Series-Section Transmission Line Impedance Matching; Put Your All-Mode 2 Metre Rig on 220; Transmitter Design — Emphasis on Anatomy, Pt. 3; CB to 10 Metres; Power Relations and Decibel Made Painless; West to Macao; How Safe is Your Ham Shack? Pt. 2; OSCAR 8 Has a Message for You; Results, 1978 Simulated Emergency Test Results, 31st ARRL VHF Sweepstakes; Rules, 1978 ARRL UHF Contest; Of, By and For . . .; The Worst Form of Government; Moved and Seconded; South America and WARC 79.

QST August 1978
A 2 Metre Frequency Synthesizer; Transmitter Design — Emphasis on Anatomy, Pt. 4; Simple Ladder IF Filter; The Audiobox — An Amplifier with a Twist; Updating Phased Array Technology; A Programmable Regulated Power Supply; Antennas — Keeping Them Up; Amateur Radio Shines through the Blizzard Blitz of '78; CQ Ham Radio; What's So Rare as a QST from 1915; September VHF QSO Party; Revised Club Competition Rules; Results, 1978 Novice Roundup; Those FCC Exams; San Diego, Here I Come; ARRL Testifies in Support of Goldwater RFI Bill; Amateur Radio in Pakistan.

RADIO COMMUNICATION September 1978
A Simple Repeater Control System; The Phoenix; Modifications to the FR50B; Technical Topics; OSCAR News, FAE Courses 1978-9; HF NFD 1978 Results; Contests Calendar SSBTV Scene; Raynet— Special Event Stations Mobile Rallies Calendar.

73 July 1978
Enjoy All Five Bands; Reincarnating Old Test Equipment; Finding Radio Pests; Video Magic for Your Home; Novice Guide to Phased Antennas; Can a $20 FM Rig Work?; Hiss Exterminator; Instant Engraving; The New, Improved Automatic Thermostat; Give 'Em a Break; It's Flora Clock; Build Your Own Digital Dial; The FM Rebroadcaster; J. B. Fields, Radioman; Counter Accuracy for Perfectionists; The New Op Amps; 22 Remote; Handling Old George; The IC-22S Scanner; Computerized Capacity Meter; A Much Needed Micoder Power Supply; Your Scope Can be Improved; How About SSB CB Conversions; The Universal Notcher; The $5 Memory Keyer; Should Repeaters Use Sub-Audible Tones; RAMmed by Morrow; Six Said His First Words Today; The 22S Programmer Program; The Occult Computer; A Baudot Program for Your Micro; VHF Notch Filter; Yes, You Can Build a Synthesizer; Beat the Microphone Blahs; Forbidden Contacts; A Darn Good IDer; Pick a Frequency . . . Any Frequency; Sometimes a Kit Is Best; Coming Out of the Cold; Roy Rogers Special; Triggered Sweep; VHF Transverters and the FT-101; Instant Paddle; Watch the Wind; The War Against Rust. ■

QSP

YUKON PREFIX

July 1978 QST advises that the Canadian DOC has changed the prefix of all amateurs in the Yukon to VY1. Amateurs in the north-west territories will retain their VE8 calls. ■

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- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.

FOR SALE

Surplus Conversion Manuals, radio astronomy, weather satellite, FM and Repeater books, VHFer, EA, ETI, RTH, E.E. Mags. GC, pwr. trans., pwr. supplies, meters, antennas, Ameco PCL RF preamp. 1.8 MHz-54 MHz; many other misc. items; send large SAE for lists. Jeff Silvester L30409, QTHR. Ph. (03) 546 3940 A.H.

TS520, complete with AC-DC power supply (1977 model), perfect cond., $600, or swap for near new FT7, with or without AC-DC power supply — will haggle. VK2AZT. Ph. (069) 42 1392.

Kenwood TS700S 2m multi-mode transceiver, as new cond., $700 ONO. S. Greening VK2ADP, 4/56 Wallace Street, Kingsford. Ph. (02) 398 2951.

Hidaka VS-41/80 KR multi-band trapped vertical 10-80m, incl. VS-RG radial wire traps for 80m and 40m, $90; 3 el. mono band beam antenna for 10m/11m, $60. VK3NRB. Ph. (03) 459 8378.

ICOM IC202E 2m SSB, new model 3W PEP handheld/base transceiver, unused, in original packing with standard accessories, $165 cash. Ian Cousins VK5IK, QTHR. Ph. Eudunda (SA) 252.

Kenwood TR7400A, 2m mobile, 800 ch., 25W, $449; Kenwood TS700A, 2m all mode base transceiver, $699; trap vertical 18 AVT 80-10m, $95; all equipment new. VK2ZHL, QTHR. Ph. (047) 31 1616.

Drake Rx SSR1, $220; Katsumi electronic bug key, model EK 127, $35; Katsumi programmable memory electronic bug key, model EK 1024, $120. VK3ZAN, QTHR. Ph. (03) 306 9380.

Hygain 204BA 20m mono band yagi with BN86 balun, good cond., 3 yrs. old, $155. VK3UV, QTHR. Ph. (03) 90 6424 A.H.

TEN-TEC Century/21 solid state CW tcvr., model 574 (digital), as new, $475; Eddystone 880/2 Rx 30, band high stability full coverage — 400 kHz to 30 MHz (1 kHz readout), five position selectivity xtals, filters, $400; Nagara 5-band trapped vertical, as new, $100, or exchange lot for IC701 tcvr with cash adjustment. Ralph VK5NRD, Regency Park Community College, Regency Park 5010, S.A. Ph. (08) 46 6260 anytime.

ICOM IC-22 2m FM Trx., mobile mount, manual, channels RPT 2, 3, 4, 8, Simplex 40, 50, Scalar 25 5/8 mobile antenna, $140. VK3ZZT Cesare, QTHR. Ph. (03) 51 9156 Bus., (03) 277 2023 A.H.

Morse Key, Wm. Nye, American type with switch, brand new in box, $14. VK3XU, QTHR. Ph. (03) 725 0824.

Uniden 2020 SSB Transceiver, 10-11-80m, 240V AC, 12V DC operation, with Uniden 8010 external VFO, matching Uniden speaker, microphone, in as new excellent cond., suitable for novice and/or full call operation, $650 complete. VK2JO. Ph. (02) 36 7756 or (02) 389 0428.

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Trio AG202A Audio Sig. Gen., $100; Trio SG402 R/F sig. gen., $100; communications Rx, type R5223 (1.5-30 MHz), plus tuning and line up details, $100; Johnstone Viking converted to 10m, complete with circuit and photo handbook, $80. VK3BIW, QTHR. Ph. (03) 560 3513.

ICOM IC-22 FM Transceiver, mobile mount, xtals ch. 40, 50, manual and carton, ex. cond., $155; Eimac 2 x 7035/4X150D linear finals, 1 x 8621-4CX250F, also GE 0-6 RF amp. ammeter, $40. Reg Hardman VK4XH. Ph. (07) 341 2228.

UNIDEN 2020 Transceiver, complete with mic., external VFO and matching ext. speaker; all units in mint cond., unmodified in any way and complete with manuals. Will not separate, $700 the lot. All offers considered. VK3ASI, QTHR. Ph. (052) 9 9692.

18 AVT/WB Vertical, $95; Yaesu UD844 desk mike, $30; Daiwa RF550 AC-DC 6 dB speech processor, $130. All as new. VK4ZT, QTHR.

Realistic AX 190 Communic. Rx, without faults and unmarked, amateur bands 80 to 10m and 15 MHz, 27 MHz, complete with 12V lead and instruction book, $165. VK2NDT, QTHR. Ph. (02) 871 8394 A.H.

Philips Colour VCR, model N1500, VHF—in/out, video—in/out, with svce. manual, $715; Shibaden SV700E ½ in. B/W VTR, complete with conv. kit and instructions for colour conversion, inc. h/book, $325; Philips ½ in. VTR LDL 1000 (new), plus w'shop manu., $225; Heathkit digital multimeter kit 1M-1202, $72; 3 x 1 in. Vdiicon camera tubes, brand new, amateur grade, $30 each; professional flying spot scanner tube MC13-16, $25; Hewlett Packard freq. counter 5381A (7 digit), near new, $250. Mick Cole VK6TV, QTHR. Ph. Kellerberrin 245, A.H. 303.

Power Transformers, 240V PRI 110-127V sec. at 16A (1760W-2032W), ideal for high current power supply; a steal at $40 each. VK2DC. Ph. (047) 39 2782.

Toroids as on p. 581 of 1978 ARRL handbook, take legal power 3-30 MHz, $7.55 each, plus p. and p. 50c for one, $1 for two. VK3AGF, QTHR. Ph. (03) 379 6524.

FTV650 6m Transverter, 195; Cushcraft 5 el. beam, $59, both never used; crystals for IC22A, five anti-repeater, R3, R4, R5, R6, R8, $8 per set or $35 the lot. VK2BBJ. Ph. (02) 84 7170 or Bus. (02) 631 7588.

FT620 50-54 MHz Transceiver with AM filter, $290; Hygain beams, 10-15m duo-bander, $125; 20m 4-el. 204, $170; TH6 tri-bander, offers. VK1VP, QTHR. Ph. (062) 48 5882 A.H.

TS520 AC-DC outboard VFO hand mike, $750. VK2ACC, QTHR. Ph. (02) 520 8659.

FV401 VFO, $130; SP400 speaker, $35; Heath HFW-1 sweep generator, 3.6-220 MHz, with manual, $60; 4 TT22 valves, suitable 400W linear with GEC circuits and data, $20. VK2ZHF, QTHR. Ph. (02) 631 1269.

3 GHz x 5 ft. 6 in. Dish, fully steerable, with 24V DC motors, bearing 0-360 degrees and elevation 0-180 degrees, remoted using 50V Selsyns, waveguide feed, $250; B-60 Tx Rx 4.5-5.0 GHz, complete less dishes, tropicalized, new 240 V AC, 3 ch. RTTY duplex and 1 voice, $100 for two; 12 core cable x 50 ft., new with plugs, $8; 1 MHz vacuum mounted xtal, $10. Doug VK3YMG. Ph. (058) 21 2309 Shepparton.

The ideal present. A complete Novice self study kit, theory tests, questions, morse tapes and text; ideal for budding Novices, only $15 posted. WIA (NSW) Education Service, PO Box 109, Toongabbie 2146.

Morse Tapes C60 Cassettes — specify morse speed with order — only $2 posted. WIA (NSW) Education Service Tapes Officer, F. Santos, 8 Cooper Street, Blacktown 2148.

Ten 4-125A Valves (manf. by Siemens), unused in cartons, $15 each; four 10.7 MHz HY-Q xtal filters (QMF 10712), new, $12 each; model 15 TTY keyboard with tape punch, $20. VK4KC, QTHR.

Kenwood TS520S Transceiver, 40 ft. telescopic tubular mast with 80, 20 and 10m dipoles and co-ax. feeders and SWR3 meter, $600 ONO. VK5VE, QTHR. Ph. (08) 258 6070 A.H.

IC202 2m SSB, mint cond., with IC20L 2m linear, $220 the pair. VK3WW, QTHR.

TS520S, showroom cond., plus YD844 desk mike, $670. VK2AAM. Ph. (049) 43 7000 A.H.

Standard SR-C146A 2m FM, 5 ch. hand held tcvr., with leather case, Ch. R2, R4, R8, 40, 50 fitted, AC charger, Nicad batteries, helical ant., speaker/mic., earphone, orig. packing, $225. Brinsden VK3YFJ. Ph. (03) 560 5233 Bus., (03) 870 0640 A.H.

Tower, triangular, self-supporting, hinged at base and halfway up main section, 44 ft. high with ladder; will extend to over 60 ft.; can be transported in two 22 ft. sections, $150 or best offer. VK2ZHR. Ph. (049) 45 9373.

WANTED

Looking for equipment with which to work on 6m FM. VK2AJS, Unit 6, 34 The Trongate, Granville 2142. Ph. (02) 682 4015.

ICOM 502 Portable 6m Transceiver for new licensee; also other 6m accessories, beams, etc. Prices and particulars to L. White, 30 Oaklands Parade, East Brisbane 4169, Qld. Ph. (07) 391 6160.

Photostat copy of PC board of the VOX constructed by W1KLK, originally appearing in QST for March 1976. VK4NBP, QTHR.

Allen Bradley Feed-through Condensers, 450 to 1500 pF, as used in VK3 432 conv. or some older TV tuners; will pay $1 each for new or used; also wanted to know anybody interested in purchasing a range of chip capacitors. VK5MC, QTHR. Ph. (087) 35 9014.

Collins 800 Hz Filter, type F455FA-08 or 500 Hz filter, type F455FA-05 to suit 75S3 receiver. A. Stowar VK2AS, QTHR. Ph. (02) 467 1784.

All Mode 2m Transceiver or FM multi-channel, solid state or hybrid; also high band VHF FM single channel transceiver, solid state pref. Max Wood VK3NHZ RMB4217, Tallangatta 3700. Ph. (060) 72 5217.

Conversion details to 28 MHz for super Panther, American Electronics 76-577 digital PLL SSB CB. VK2ZQC, QTHR. Ph. (02) 81 2143 A.H.

TH3 Junior, good cond. Ph. "Jack" (03) 758 5670.

SERVICE

FT100. Would some poor but cluey amateur overhaul this TRX please? Pay hourly or as contract. Prefer bod within Sunday drive. VK2AEM, QTHR. Ph. (02) 871 8183.

TRADE HAMADS

Central Coast Amateur Radio Club 22nd Annual Field Day. Sunday, 18th February, 1979, Gosford Showground. Radio events, trade displays, market place, ladies' stall, children's events, afternoon outings, showground food bar open, pensioner concession. Book accommodation early. For full details send SASE to PO Box 238, Gosford 2250.

XITEX "Glass Teleprinter", needs only a keyboard and TV set to originate and display 16 lines of 64 chars; switchable for 45.45 Baudot-110/300 ASCII, 20 mA or TTL interface; full U/L and Greek chars in ASCII mode, addressable cursor; feed on-board PSU 9-12V AC or plug into an S-100 slot; micro computer controlled pre-programmed; full kit, $169, including delivery and sales tax; suitable keyboard kit, $70. From The Micro Shop, Box 207, Gawler, SA 5118.

QSL Cards, log books, contest log sheets — send 20c stamp for samples and prices to Linda Luther VK4VV, P.O. Box 498, Nambour, Qld. 4560.

APOLOGY TO ADVERTISER

J. Vaile Quad parts advertisement on page 13 of November AR — prices were incorrect and should have read $44.20 instead of $39.50 for the Quad Hub and $190.50 instead of $153 for the Quad Kit. The correct prices were shown in the AR advertisement on page 17 of June AR. ■

IONOSPHERIC PREDICTIONS

Due to early printing deadlines for the Christmas/New Year holidays, we regret that the Ionospheric Predictions chart was not able to be included in this month's issue — please refer to last month's chart for a guide to openings.—Ed.

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. T. F. EVANS	**VK2NS**
Mr. G. D. KING	**VK2ZUD**
Mr. T. J. C. BROWN	**VK2ZBL**
Mr. G. P. LEE	**VK3SN**
Mr. RON HUGO	**VK6KW**
Mr. KEN J. (SNOWY) MILLBOURN (Prop. Ham Radio Suppliers)	**VK3CW**

OBITUARY

Mr. RONALD W. HUGO VK6KW

It is with deep regret that we record the passing of another OT, Ronald William Stuart Hugo.

Ron passed away on September 15th, after being hospitalised some time previously as a result of a stroke.

He was licensed in 1937, and active till his passing. Always an active amateur, he was keen on working DX, and spread his friendship throughout the world by this means.

He saw service in the RAEME, AIF and, following hostilities, took up the administration of Amateur Radio, through both the WIA and RSWA simultaneously. He was elected to Federal Council from 1952 till 1963.

In both bodies he was elected to Life Membership. For many years the VK6 Division received more attention and care than most would give of their leisure time. Many amateurs will remember Ron from his employment by Atkins (WA) Ltd. Often to be seen in his office near the front counter, a friendly nod, or a quiet greeting would be given when he saw you.

During all that time, he and his wife brought up a family of four, and it is to them that the members of this Division and Amateur Radio extend their sincere sympathy.

WILLIAM CARLYLE JOHNSTON VK2CJ

The recent death of William Carlyle Johnston VK2CJ, of Sawtell, NSW, marks the loss of one of Australia's pioneers in Amateur Radio.

Carl became interested in radio in 1926 while at that time he lived at Grafton, NSW, where he set up his first station. He moved to Coffs Harbour in 1936 and then to Sawtell in 1947. Carl has been an active Radio Amateur for almost half a century, during which time he made radio friends throughout the world. Carl is survived by his wife, Eileen, two sons and two daughters.

John Gerard VK2ADN.

TREVOR EVANS VK2NS

Trevor's many friends throughout Australia and overseas will be saddened to hear of his passing at Bathurst, NSW, on Sunday, 29th October, 1978.

He was born around the turn of the century at Blayney, NSW. At a very early age he became interested in radio communications and in 1912 he experimented with a Spark Transmitter and a Coherer Receiver. He was licensed in 1923 and from that time until the day of his death he was actively engaged in all facets of amateur radio. He was an immaculate CW and Phone operator. His "Fist" and operating procedure was world renowned and an inspiration to all.

Many years ago he specialised in accurate frequency measurements and was one of the pioneers in hand grinding crystals, having supplied these to broadcasting stations.

Apart from Radio, Trevor had many hobbies. During the 1930s he became interested in dirt track motor cycling. He also was an expert photographer. Model making was another hobby at which he excelled, constructing miniature blast furnaces for smelting iron ore, steam driven locomotives, turbines and stationary engines. He also built hot air and suction gas engines.

In 1931 Trevor won the British Empire Radio Union's trophy in the inaugural contest and the trophy was presented to him in Sydney by the Lord Mayor, Alderman J. Jackson. Many of his associate amateurs attended.

VK2NS in 1926 founded the Rag Chewers' Club, which functioned for many years to encourage and improve the standard of CW operation. He was a member (No. 575) of The Oldtimers' Club and held the No. 1 50 Years Award.

For 55 years Trevor upheld the principles of the amateur radio code.

To his wife and family we extend our deepest sympathy.

VK2XQ.

RAY OHRBOM VK3OC

And still another old-timer has left our bands for unknown frequencies . . . Ray Ohrbom VK3OC. He will be remembered by OTs as a keen member of the VIC WIA council and one of the Centenary Contest Committee in 1934. At WIA meetings we recall his somewhat terse and often controversial opinions following a drawn out debate which were invariably accepted. He was an active CW operator until the advent of black boxes and SSB, and he had his share of good DX. In the early days of the home brew era his transmitters and receivers were a delight to behold and very efficient were they. His "loop modulation" was a gem. Ray leaves behind his two daughters Dawn and Judy with their young families. His wife Betty predeceased him by two years. Ray passed away on 30th October 1978.

(M. R. Campbell VK3MR)

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The success story of the export quality FT-101 must make world amateur radio history. First produced in 1970 the FT-101 has been refined and improved to make it better than best for your money. The latest FT-101E represents tried and proven performance and real value. You'd have to say it will be the best selling HF amateur transceiver in the world.
The FT-101E can be modified to suit novice requirements.

It comes complete with **a more effective noise blanker specified by, and exclusive to, Bail Electronic Services**; R.F. Speech Processor, Calibrator, matching Yaesu Hand Microphone, eight pole SSB filter, 12v DC-DC converter as well as **234v AC** operation with Australian approved 3 core cable and 3 pin plug, **factory produced English language handbook** (not a photo-copy!), spare plugs and connectors, etc.

Features:

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* Automatic break-in CW operation with sidetone
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* ±5 kHz receiver clarifier w/separate ON/OFF switch
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* Heater switch to shut off final tubes for conservation of current drain
* Reliable easy to operate lever switch
* Adjustable carrier level for tune-up and novice operation
* Built-in speaker
* High-Q, permeability tuned, RF stages to provide the performance required even in base station operation
* Includes dynamic, hand-held type microphone
* Indicator lights for internal VFO and clarifier operation
* Eight pole SSB filter for unparalleled selectivity on today's crowded bands
* All-mode operation — SSB, CW, & AM
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FT-101E

90 Day Warranty

Write for New Yaesu Catalogue detailing this and other sets in the Yaesu range. Please include 50c postage.

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But hurry! The way the Yen is still strengthening, we can't guarantee these prices for much longer!

Fabulous Yaesu FT-101E — Rolls quality at a mini price!

Impartial tests * prove the FT-101E receiver section far superior to the Kenwood TS-520S:

Minimum detectable level:	FT-101E 8dB more sensitive
Intermodulation distortion:	FT-101E 4dB better
Dynamic range:	FT-101E 12dB better

(independent 'QST' report)

PLUS: **in-built** DC-DC converter (not 'optional')
in-built RF speech processor (not 'optional')
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Cat. D-2860 **ONLY $975.00**

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An excellent basic HF rig at a very basic price!
THE IDEAL NOVICE OR MOBILE SET
Since its introduction, the price of this unit has only risen 4%, whereas the Japanese Yen has risen over 24% in the same time!
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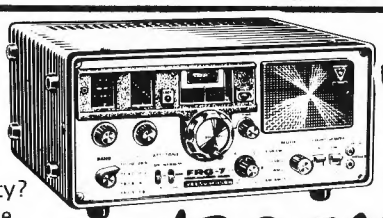

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